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The Geographical Journal

INCLUDING THE PROCEEDINGS OF THE ROYAL GEOGRAPHICAL SOCIETY.

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Evening Meetings.—Papers to be read at the Evening Meetings of the Society in May:—Monday, May 7. The Bakhtiari Country. By Colonel H. A. Sawyer. **—Monday, May 21.** A Journey in the Hadramaut, Southern Arabia. By J. Theodore Bent. The meeting of May 21 is an extra meeting; Fellows' tickets will be available as at ordinary meetings.

The Anniversary Meeting.—The Annual Meeting of the Society will take place on Monday, May 28, at 2.30 p.m., in the Hall of the University of London, Burlington Gardens (by permission of the Senate).

The Annual Dinner.—The Annual Dinner of the Society will take place on the evening of the Anniversary Meeting, May 28, at 7 p.m., in the Whitehall Rooms, Hotel Metropole. Tickets 21*s.* each, to be obtained from the Chief Clerk, 1, Savile Row. Application should be made not later than May 23, after which places will be allotted.

Any Fellow resident in this country, desiring to have notice of the subjects of papers to be read at the Society's Meetings forwarded to him, can receive such notices by post on payment in advance to the Chief Clerk, at 1, Savile Row, of 2*s.* per session.

The
Geographical Journal.

No. 5. MAY, 1894. Vol. III.

A JOURNEY IN MONGOLIA AND IN TIBET.*

By W. WOODVILLE ROCKHILL.

One of the greatest profits a traveller gains from his first journeyings in an unknown country is rather the determination of the field of research than the data he then brings back, which, of necessity, are hastily gathered and frequently misunderstood from unfamiliarity with the country, the language and the modes of thought of the people. Such, at least, has been my experience, and so it happened that, not satisfied with the results of a first journey in Tibetan countries made in 1889, I found myself in September of 1891 again on my way to China to complete, in a measure, my former researches among the Tibetan tribes of the north-east, and to extend my explorations towards the interior as far as possible. I hoped, if fortune favoured me, to be able to reach India by a route of which I had heard, leading to Shigatse, in Ulterior Tibet, without passing on Lhasa territory,† for in this latter country I knew I should meet with insurmountable obstacles—man-raised barriers more difficult to overcome than any snow-covered mountain or wind-swept desert.

On November 17th I reached Peking, where I passed twelve days waiting for the renewal by the Tsung-li Yamen of the passport it had given me in 1888.

* Paper read at the Meeting of the Royal Geographical Society, February 27th, 1893. Map, p. 444.

† I should use the term *Deba-zong* instead of "Lhasa territory," but the latter is more readily understood, if less exact.

The provinces I was authorized to visit were Kan-su, Su-chuan, the Kokonor, Turkestan, and Yun-nan, no mention being made of Tibet. This form of passport I found quite sufficient, for no routes being designated on it, I was at liberty to follow the most roundabout way in going from one of the provinces mentioned to the other.

On December 1st I left Peking for Chang-chia-ko (Kalgan), accompanied by one Chinese servant, we and our luggage tightly stored away in two carts hired to convey us to Kwei-hwa Cheng.

At Kalgan I remained for four days making some purchases, and taking sextant observations to fix as well as possible this the starting-point of the route-survey I proposed carrying on from here to the end of my journey. Leaving this great frontier mart, the road led up the valley of the Yang-ho, remarkable for groves of willows, from which the river takes its name, for cave-dwellings called "fairy caves" being warm in winter and cool in summer; and for curious truncated cone-shaped towers along the foot of the hills, which the people say were once "gun towers," where the inhabitants defended themselves against Mongol or Tartar raiders. They are some 30 feet high, 12 to 15 feet in diameter on the top, and surrounded by a wall a few feet from the base. They are so numerous, and placed so regularly along the base of the hills, that the explanation given me of their use would seem incorrect; but I cannot now suggest a better one.

Passing the little Chinese village of Tsahan-obo, we entered the pasturages of the Chahar Mongols, the principal of the so-called *Yo-mu*, or "herdsmen" tribes, who are debarred by the Chinese from all save pastoral pursuits. These Chahar have to tend the imperial herds and flocks, and they supply to the Emperor a contingent of ten thousand men in time of war. Unlike other Mongol tribes, they have no chieftains of their own, but are under the rule of the Chahar Tu-tung, a Chinese Lieutenant-Governor residing at Kwei-hwa Cheng. They are generally demoralized by their proximity to and too intimate intercourse with the Chinese; many are opium smokers, all hard drinkers, and I found among them but little of the pleasing, frank, and cordial manners met with among the remoter tribes of their race.

The country between Kalgan and Kwei-hwa Cheng is about 4600 feet above sea-level, cut by low ranges of loess-covered hills running from east to west, in many places the loess over 100 feet deep. In this region, and in fact as far west as the Kokonor, rain had fallen but little for two years, scarcity was felt, and in many places there was already a famine. At Chang-ko, a day east of Tsahan-obo, the Dragon or Rain king had been prayed to, first by the men, then the women and children, but all in vain. The local official in flowing robes and tasseled hat had also besought the Lung Wang to send rain; the sky remained cloudless, and still vast flocks of sand grouse with much rustling of wings kept sweeping continually over the country,

a portent that the awful drought was not yet to end, for it is said, "When the sand grouse fly by sell your wives."

On December 18th I reached Kwei-hwa Cheng, passing vast flocks of sheep and herds of camels on their way to supply the Peking market. Abbé Huc has so well described this great frontier town that there remains little more to be said of it.* Its trade is chiefly in sheep and camels, in goat and sheep skins, tallow and camel's hair. Its people, all Chinese, and some eighty thousand in number, are about as rascally and depraved a lot as I have ever seen in China. The town is dirty and ill-built, and the inhabitants pay a ground-rent varying from 10 to 50 cash for each $\frac{1}{6}$ of acre (*mou*) to the Mongol owners.

I was anxious to learn if there were trade relations between this point and Chinese Turkestan, Hami, or Kulja. I found that only occasionally a few Chan-to visit this town, bringing little but Hami raisins and dried melons. A few more go to Pao-tu, and some push on as far as Hsi-an Fu; but the trade on the whole is insignificant.

Leaving Kwei-hwa on Christmas Day I reached two days later the Yellow River, at Ho-ko (Dugei or Dugus in Mongol), a place of considerable importance on account of its soda works, and which may prove to be the Tenduc of Marco Polo. Extensive ruins crown the hills behind it, and the town of To Cheng, called by the Mongols Togto, is a mile north of it. Crossing the Yellow River, here some 400 yards wide, I found myself in the country of the Jungar Mongols, the easternmost of the seven Ordos tribes forming the Ike-chao league. At present the first prince of the Ordos is the chief of the Jungar or Jungar-ta. In time of war he commands the Ordos contingent, and is hence known to Chinese as the Ordos Generalissimo. He succeeded to the Prince of Washun, his office being given him by the Mongol Superintendency at Peking, which is always guided in its selection by the importance of the presents made it by the different candidates.

The Ordos country along the Yellow River has been settled within the last thirty years by Shen-hsi Chinese, who had fled from their homes on the outbreak of the Mohammedan rebellion. These colonists rent land from the Mongols, and, though the whole country seemed to me a sandy waste, they told me it was fairly fertile when well irrigated. The Mongol owners of the land have retired into the interior, or adopted to a great extent, when living near the Chinese, their customs and mode of living.† It was my intention to traverse the Ordos country to Teng-

* The valley of the Hei-ho ("Black River"), where the town of Kwei-hwa stands, is bounded to the north by a range of rugged mountains stretching west to the Alashan Range. On most of our maps they are called In-shan, but this can only be a defective transcription of Ta-ching-shan, the only name I heard used. West of Pao-tu the range is called Wula-shan, then Lang-shan as far as Alashan.

† Prjevalsky on his route map of this section of country has it that it is thickly settled by Chinese. At the present day such is not the case; villages are not very numerous nor very large.

ko* on the Yellow River, but on reaching Hsiao-nor, a station of the Belgian Catholic Mission, I found it impossible to carry out this plan without considerable delay, as a guide would be necessary, and I must carry forage for the whole trip, some seven days. So I crossed over to the left bank of the river and remained on that side till I reached Lan-Chau Fu, the country most of the way a desert waste of drifting sands. Alashan (or Alaksha, as the Mongols call it),† through which my route led, extends from a little to the east of the flourishing Christian communities of San-tao-ho-tzu to Shi-tsui, where the province of Kan-su begins. Travel is rendered difficult all the way by the innumerable deep holes made over the face of the country by licorice diggers, this root being the most valuable export of this section of country. Where these pitfalls are not found, soft sand, irrigation ditches, willow brush and alkaline bogs alternate to take away what little comfort there might be in travelling through this wind-swept barren land.

Ning-hsia Fu, where I stopped for a day to hire carts to take me on to Lan-Chau, is just beginning to rise from its ruins; but even now but a small portion of the land without its walls is built over, and no Mohammedan is allowed to dwell inside the city, so fearful are the authorities of a fresh uprising. This city is the Irgekotun of the Mongols, the Egrigaia of Polo. In his time it was famed for its *camlets*, "carried over the world for sale." At present the rugs made here are equally famous among Mongols and Tibetans, to whom most of those manufactured are sold, so that they are but rarely seen in China.‡

The plain surrounding Ning-hsia, from Shih-tsui-tzu to Chung-wei Hsien, a distance of about 175 miles, is in many places covered with drifting sand, in others it is an alkaline marsh with here and there patches of mixed loess and gravel. Chinese enterprise has converted this unpromising plain into one of the most fertile districts of the province. Huge irrigation ditches starting from Chung-wei and Ta-pa carry water all over the plain. One passes every mile or so bustling villages where wheat and rice, the country's chief products, are sold; and one finds pears and apples, persimmons and chestnuts, and all manner of vegetables. These great canals were made, it is said, in the seventeenth century by order of the Emperor Kanghsi.

* Teng-ko is in Mongol Tungor, and is Prjevalsky's Ding-hu. It is a very small village on the right bank of the Yellow River, though, curiously enough, it figures on most maps as being on the left bank. It is known to have existed in the thirteenth century, and was probably, until the late rebellion, a place of considerable importance, as it is on the direct road to Kwei-hwa and Peking.

† But the name is not, as far as I can learn, a Mongol one; at least, no one could give me a satisfactory explanation of it.

‡ Mongols and Tibetans call these rugs "Alashan Rugs," and Chinese speak of them as *tsai-jung-tan-tzu*, "velvet or plushy carpets." Sir Henry Yule tells us ('Marco Polo,' 2nd edit., i. 274) that the word *Khamlat*, whence is derived our "camlet," also bears with it this idea of plushy. Can the present rugs be Polo's camlets?

I must pass on rapidly to Hsi-ning Fu, in Western Kan-su, for my journey was to Tibetan countries, and I must not take up your time speaking any more of China, however interesting the subject may be to me.

Passing through Lan-Chau Fu, which I reached the day after the Chinese new year (January 31st, 1892), I followed, as far as Hsi-ning, the route up the valley of the Hsiho I had taken in 1889; then, stopping only a night at Hsi-ning to send word to the men who had followed me in 1889 into Eastern Tibet to join me at Lusar (Kumbum), I made for that most convenient village, which I reached on February 11th. The men responded promptly to my call, and so I was at once relieved from what had given me so much trouble on my first journey—getting men who did not fear to face the real hardships and more or less imaginary dangers of the Tibetan and Mongol wilds. While my headman was busy buying mules, saddles, clothes, and supplies for the journey westward, I decided to visit the Salar and some of the agricultural Tibetan tribes near the Yellow River.

On February 17th, when I left for the proposed trip, it snowed heavily, the first snow we had had since passing Tsahan-obo, in Eastern Mongolia, and we experienced considerable difficulty the next day in making our way along the narrow, slippery bridle-paths which led us across the Nan-shan. This range, the eastern portion of the South Kokonor chain, offers a most admirable illustration of the mode of formation of the loess and of the continual redistribution going on, and the formation of new deposits under the action of the torrential rains which for months every year deluge this section of country. Here in this loess-covered country I found that the "Aborigines" (Tu-jen), and they alone, live for the most part in cave dwellings or in houses in which the rear portion is dug in a cliff of loess. Of the history of these tribes I know nothing, save that they undoubtedly occupied this country long before any of the other non-Chinese tribes now inhabiting it. The question suggests itself, Are not these Tu-jen of the same race as the Man-tzu who dug the caves in the valley of the Yang-tzu, in Su-chuan? The caves of the latter are more highly ornamented than those of Kan-su, but then the Man-tzu excavated theirs in sandstone, whereas the northern Tu-jen had only friable loess to work in, which offered no scope for ornamentation.

The first place we stopped at south of the Nan-shan was Tsapa, a place of some importance, with a small garrison commanded by lieutenant, a substantial wall, a mosque, and some three hundred families more than half Mohammedan. It is a stopping-place between Lusar and Han-chung, in Shenhsi, for salt smugglers. They buy the salt at Lusar from the Tibetans, who get it in the Dabesu-gobi, east of Dulan-kwo, and bring it to the market without having to pay any duty, and by following this trail no likin stations are met with, and a fair profit is realized.

Beyond Bayan-rong, an unimportant sub-prefecture, we crossed a high and difficult mountain, the Ra-ja shan, and stopped for the night at Lamo-shan-ken, a village of Kargan Tibetans. These Kargans, from long intercourse with the neighbouring Salar, have for the most part become converts to Islam, and certainly gained somewhat by the change, being cleaner, more enterprising and richer than their Buddhist compatriots. Nor can the work of conversion have proved a difficult task for the Salar; they had only to let the Tibetans see the lives they led, and how much more work they got out of their women-folk than any neighbouring people, to gain them over at once to their faith. The converts have nobly walked in the footsteps of their teachers; the men work as little as the Salar, relinquishing without a murmur all the household drudgery to the women, who seem to revenge themselves by bullying their lords and masters on every occasion. Their change of faith appears to have added a little to the characteristic pugnacity of all Sifan. Hardly a day passes that a man is not killed or maimed in some one of these Tibetan villages. The men pass most of their time making or repelling attacks, and every commanding hillock near a village is occupied by sentinels watching every line of attack.

We came to the Yellow River nearly in front of I-ma-mu-chwang, "the village of the Iman," the abode of Han Pao Ahon, the chief priest of the Salar. Crossing over on the ice we entered the village, and after some difficulty found lodgings in one of the houses, for there are no inns in the country.

The Salar (or Salaris) have no written tradition concerning their advent into China; they say, however, that the first of their people who came to this country arrived in the third year of Ming Hung-wu (A.D. 1370). They were but three, and drove before them an ox loaded with all their worldly goods, and had come from Samarkand, whence they had been driven by a civil war. They stopped where now stands Katzu-kun, the first and largest of Salar villages. They were soon followed by others of their people, and their settlements grew in number and in size, so that at the present day they number some forty thousand souls, scattered in several hundred villages between Hsun-hwa Ting and Fei-tzu (Shui-ti) chuan, a village about 40 miles further west. Their country is divided into eight "*kun*" or "thousands," hence the name usually given to it by the Chinese, Salar-pa-kun. There is, as far as I know, nothing improbable in this tradition; moreover we find the name of Salar as that of a large tribe living at the present day near Merv in Turkestan, beside the Sarik and Tekke. Though I have not read anything concerning this eastern branch of the Salar in Chinese historical works, there is every reason to believe that a more careful examination of them than I have been able to make will supply corroborative evidence of the truth of the oral tradition.

From the Salar villages I turned westward and travelled to Ku-ei-te, the trail leading over the high, steep foot-hills of the ranges which here hem in the Yellow River. The mountains south of the river were covered with forest-growth, pines, juniper, birch, and cyprus. In little clearings were Tibetan log-cabins surrounded by patches of culture where barley and wheat were grown, and to which water was often carried, as in Switzerland, by long troughs cut in pine logs propped on high poles. The houses are flat-roofed, and but a storey high; inside there is no partition wall; one end of the building serves as a stable, in the other the family sleep on a Chinese *Kang*, or stove-bed, headed by a big Tibetan cooking-stove where the tea cauldron boils, and over which is a prayer-wheel, turned in the heated air as it escapes through a big hole in the roof. Most of these Rong-wa (agricultural Tibetans) are followers of the Binbo religion, and in some corner of every house is a little altar with a bowl containing offerings of the products of the country—barley and wheat, yak hair and sheep's wool—to Shenrab, the great god of their faith. Over the houses, tied to long poles, white flags wave printed with prayers and charms to ward off danger; and below the house, in a log hutch built over the brook, a big prayer-barrel is kept turning ever by the water as it dashes by. I reached Ku-ei-te on February 26th. This frontier town lies in a narrow plain some 6 or 8 miles long. In it live some three hundred Chinese families, and in the surrounding plain are numerous agricultural Tibetans (Rong-wa). Mohammedans are not allowed to reside in or near this town—a punishment for their having massacred the sub-prefect at the outbreak of the late rebellion. The climate is warm; but it is said to be an exceedingly windy place; little snow falls here, though for six months of the year the surrounding mountains are covered with it.

Ku-ei-te produces wheat, millet, and hemp, most kinds of vegetables, also pears, peaches, apples, water-melons, and jujubes; but the place has no trade—a few lambskins, some musk, and rhubarb are all it exports.

I crossed back to the left bank of the Yellow River on leaving Ku-ei-te, and passing by Karang (Count Szechenyi's Kashan) and over the Laye Pass, made my way back to Lusar, which I reached on the 29th, to find nearly everything ready for the final start westward. It was, however, March 14th before we left, so long does it take in this home of procrastination to complete arrangements.

The supplies I carried with me were for six months, and consisted of tsamba (parched barley meal), flour, tea, rice, and vermicelli (*kua-mien*), besides a stock of sugar, rock-candy, dry jujubes, raisins, etc., all most useful in these countries where small gifts are being continually exchanged, and where a present always calls for a return one of at least equal value.

My party, as finally organized, consisted of the headman, Yeh Chi-

cheng, who had been with me in 1889, a cook picked up at Kwei-hwa Cheng, and three Hsi-ning men, who had also been with me for some time on my first journey. All of them were Mohammedans, and, with the exception of the cook, typical Chinese frontiersmen—travellers from their childhood, and speaking fluently both Mongol and Tibetan. I had six ponies and seven pack mules, but, so as to keep the latter in good condition as long as possible, I loaded all the luggage, some 1500 pounds, on donkeys hired to go as far as the Dabesu-gobi country, some ten days' march, the mules only carrying barley to feed them along the route. As money I took with me 1000 ounces of silver, some 500 rupees, and goods for barter of about equal value. Each man was supplied with a sheepskin gown, fur cap, wadded trousers, heavy leather boots, felt stockings, and rain-coat, and a sheet of felt to use as a saddle-cloth in the day and a couch at night. Two copper kettles, one for tea, the other to cook food in, a couple of ladles and a bellows, completed, with two very small blue cotton Mongol tents, our equipment, which I found satisfactory and sufficient, though scarcely luxurious. Two sets of extra shoes were taken for each of the horses and mules; unfortunately we did not take a large enough supply of nails, for, not being good smiths, we spoilt many, and for a long time had to leave our animals unshod, which resulted in their feet becoming tender, and in the ultimate loss of the whole lot, not one reaching the journey's end.

Once more crossing the South Kokonor range, this time by the Hung-mao-pan-tao, I came to Sharakuto, a little frontier post commanding the roads to Gomi on the Yellow River, to Tankar, and to Dulan-kwo, west of Kokonor. Leaving behind us the low Jih-yueh shan, which here marks the frontier of Kan-su, we traversed the valley of the Rhirmo-jong (or Tao-tang-ho), the only stream of any importance which empties into the Kokonor from the south, and entered the basin of the Wayen-nor, one of the numerous lakelets which dot this region. The country is an undulating plateau, bounded by low hills running east and west. To the south-west in the direction of the Yellow River we could see, a hundred miles away, snow-clad peaks rising above the bare reddish maze of mountains. Not a tree, not a shrub anywhere, here and there a black tent and a little flock of sheep huddling together to escape the fierce incessant west wind. This is the country of the Panaka or Panakasum, who, coming from south of the Yellow River, have within the last fifty years dispossessed the Mongol owners of the land, driving them back towards the bogs and desert wastes of the Tsaidam. It is a magnificent pasture-land, but poorly watered, except at the foot of the mountains, the little streams either disappearing underground or becoming after a few miles so brackish that the water is undrinkable.

From the Wayen-nor * we could see the mountains which mark the

* Wayen is a Tibetan corruption of the Mongol word *bayan*, "rich, prosperous."

famous Gork gold-fields, from which the Yellow River and the "three days desert" (Kurban Tara) separated us. Discovered in 1888, they yielded to the Chinese, who flocked to them, over 10,000 ounces of gold in less than two years; but now they are abandoned, the primitive methods of the gold-washers being only remunerative with the richest gravels.

Some 40 miles west-south-west of the Wayen-nor, we passed into the basin of the Gunga-nor ("Egg lake"), into which the Huyuyung flows. This is the principal stream of this region, its chief feeders being the Muri-chu and Wahon-chu, which have their sources in the mountains to the south. I could not ascertain whether the Gunga-nor had an outlet into the Yellow River, but am inclined to think it has, though possibly its overflow may find its way under the loose sands which cover the eastern end of the depression in which I saw its glistening surface. As we advanced towards the high mountains to our south-west, which, by the way, are the eastern extension of the range I traversed in 1889 to the south of Dulan-kwo, and there called Timurte, black tents and flocks of sheep became more numerous. On March 25th we camped on the Muri-chu, near some twenty or thirty tents of the Chu-ja Panakasum. Here the donkeys hired at Lusar were to leave us, and it was necessary to get pack-yak and guides to take me by the direct, but rarely followed, trail, across the mountains to Shang.

On the 28th, we entered the valley of the Wahon-chu (or chuka), and made our way in two days to the foot of the pass leading into the basin of the Tsahan-ossu, one of the big rivers of the Tsaidam. It took us two days to cross this pass, the most difficult I have met with in my travels in these regions. Snow was deep on either side to some 3000 feet below the summit, soft snow hiding the jagged rocks over which we stumbled, horses and men frequently disappearing between them. The trail, hardly visible even in summer—for this pass is only crossed at rare intervals by small parties of yak hunters—we never saw, and we had to pick our way as best we could up the steep mountain sides to the top, 17,000 feet above the sea-level. Two nights we camped in the deep snow, our animals without grass or water, huddling together under projecting ledges of rock. We now entered the valley of the Tsahan ossu ("White River"); on every side were mountains of reddish granite sprinkled here and there with loess. For four days we followed this stream, which I found was the upper course of the Shara-gol ("Yellow River"), crossed in 1889 in the Tsaidam north-east of the village of Barong (or Barongkure).*

Leaving the Tsahan-ossu, we camped on April 3rd on the southern

* This river, only second in importance to the Bayan-gol itself among the water-courses of the Tsaidam, is not, as an examination of existing maps might lead one to suppose, the Upper Tsa-tsa-gol. This latter flows to the north of it, and has its sources on the west slope of the mountains where the Tsahan-gol rises.

slope of the Koko-kutul ("Blue Pass") amidst cedar and juniper trees, the first we had seen in these regions. This was the head of the fine grassy valley of Keter-gun, inhabited by some sixty or seventy families of Rerin Panaka. In its lower portion it is called Derben-chin ("Four catties"); and at its mouth, near the village of Shang, are Mongols who live in mortal dread of their aggressive, thieving neighbours.

I stopped only a few days at Shang to take some observations and make purchases of food; then, sending two of my men with all the baggage to the camp of my former acquaintance, the chief, or Zassak of Barong, I left with his headman, Dowe, my former guide in Eastern Tibet, who had come to Shang to welcome me, and two of my Chinese, to visit once more the Tosu-nor and fix its position and altitude. I met at first with determined opposition from the Abbot (Kanpo) of Shang, who gave orders that no one was to accompany me, as it was my intention to try and catch the horse and fish of gold living in the waters of the lake. I talked him out of this conceit, however, and was able to make the journey in peace, though not in comfort, for I was so unfortunate as to have my horse drowned while crossing the Yohure (or Yogore) gol on the ice, nearly sharing the same fate myself, and my two Chinese, in consequence of my bad luck and disgusted with the hardships we had daily to encounter, decided to leave me on returning to Shang.*

On April 16th I was back at Shang, where I induced an old Chinese trader I had known there in 1889 to guide me to Oim, a little valley near the Ike-gol, where the chief of Barong had his camp. Had it not been for old Ma Shuang-hsi, or "Double luck" (thus called because his father's cow had calved on the day of his birth), I should have had to find my way there as best I could, for I was nearly boycotted on returning to Shang—my two deserters and Dowe having poisoned the minds of both Mongols and Chinese against me.

The prodigious credulity of the Mongols is well illustrated, I think, by the following: Some five hundred years ago, they say, there was an Emperor of Russia, or some foreign country, who was desirous of knowing what was in the sun and moon, whether they were peopled or not, and if they were hot or cold. He took fifty Mongol men and as many women, shut them up in a crystal casket which could fly through the air, and started them off on their voyage of discovery. Since then they have never been heard of, and Mongols have frequently questioned me concerning them, and asked me what I could advance in extenuation of this piece of cruelty. No one believed me when I said I had never heard of this wonderful voyage, and all thought I was looking for their

* The Tosu-nor ("Butter Lake"), called "Lake of a myriad hills" (*Tong-ri tso-nak*), in Tibetan, is some 40 miles long from east to west and about 2 miles broad. Its altitude is 13,500 feet above the level of the sea. Its position as placed (conjecturally) on our maps is approximately correct.

long-lost brethren when they saw me observing the sun with my sextant. The Tibetans, it is but fair to add, are not a whit less credulous; more than one I have overheard saying that I had a battalion of soldiers concealed in the little camera I carried with me. My prismatic compass, others contended, enabled me to detect treasures in the earth and to see the farther side of mountains; and with my sextant I angled for the sun. When I came back from the Tosu-nor to Shang, the Kanpo, a Tibetan, asked me where I proposed going. "To Lob-nor," I replied, not wishing to discuss my plans. "I supposed that was your intention," he rejoined. "You have caught our horse and fish of gold in the Tosu-nor, and now you want to get the frog of gold of the Lob-nor. But it will be useless to try; there is in the whole world but the Pan-chen Rinpoche of Trashilh-unpo who is able to catch it." Various reasons, but principally the procrastination of the chief of Barong, kept me in his camp in the Oim valley until April 29th, when I left for the Tsaidam,* having decided to travel through it to Taichinar, and thence make my way to the Tengri-nor.

Just before leaving Oim I took into my service a Taichinar Mongol, Bitcheren Panti, or "The Little Scholar," by name. A clever man, able to turn his hand to any trade—blacksmith, carpenter, saddler, tailor, and exorcist—he had been twice to Lhasa, and I thought him a valuable addition to the party. His story is not without a tinge of wild romance. Until five years before I met with him, he had lived on the Naichi-gol, near Golmot, in married bliss; but his wife grew tired of him, left him, and became the wife of a neighbour. Marriage in these countries is easily entered into and more easily dissolved, and generally the abandoned one takes the separation with perfect equanimity. Panti, for some strange reason, felt himself wronged; he gave out he was going to Lhasa on a pilgrimage, and, having stolen all the horses of his favoured rival, he fled to the mountains and made his way to the Alang-nor, his design being to go to the Goloks country and lead a band of these brigands against his native place. When near the Tosu-nor he met a party of yak hunters from Shang, to whom he told his story. They persuaded him to go home with them; after a while, he gave in his allegiance to the ruler of Shang by presenting him with a pony, and buying a half interest in a house and a wife, he settled down to his trade of carpenter. Now, however, he was homesick, and he longed to get back to Taichinar; the few ounces of silver he could earn with me would enable him to start life afresh in his native swamps. He and his brother, of whom I shall have to speak later, accompanied me to near the Tengri-nor, and I was well satisfied with his services.

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* This term "salt swamp" only applies to the plain; the mountain region on the south and east sides of it has no name applicable to the whole range, but a host of names, Burhan-bota, Kwo-shili, etc., each referring to a section of the chain.

At the village of Barong * I got four camels to carry the loads as far as the Naichi-gol,† and thus spare my mules in this horrible morass, where we waded for a fortnight through mud and water knee-deep, or else through drifting sands. Travelling as near as possible to the base of the southern mountains, so as to keep out of the great central swamps, we reached Tengelik on May 5th, and the Naichi (or Naichiyin) gol on the 11th.

On the way we passed through the ruins of a walled camp built by the Chinese, when marching on Tibet in the Kang-hsi reign. It is known as Nomoron-kutun, "the town of Nomoron," from the little stream which flows by it. Around it the Mongols of Zun grow their barley in clearings in the dense willow brush which here covers the country, and within its deserted walls lives a Tibetan hermit. A little to the west of this is a *Mizar*, the tomb of some now-forgotten Mohammedan saint; at present the place is only known by its Mongol name of *Ungerhe-baishing*, "the cave dwelling." Occasionally we saw Mongol tents on some dry spot in the swamp, and each time with renewed wonder that human beings could live in such a place as the Tsaidam, where there is but swamp and sand, willow brush or briars; where mosquitoes and spiders thrive; where the wind always blows, the heat of day is intense, and the cold of night piercing. Fear alone holds them there—fear of the Golok and Panaka prevents them from occupying the rich pasturages along the clear streams in the mountains to the south of their God-forsaken plain.

I stayed at the Naichi-gol two days, rearranging the loads and buying what little food I could to replace that used on the road. On May 17th we left, and travelling up the Kurban Naichi valley came, on the 23rd, to the deserted site of an old camp, where the grass was so fine that I decided to remain here a few days to let the horses and mules pick up a little after the fortnight of starvation they had just passed through. Here I was joined by Bitcheren Panti's brother, the headman, or *Jalang* of Golmot,‡ and known as Samtan Jalang.

It was agreed between us that if he guided me to the Tengri-nor I should pay him 50 ounces of silver, and I promised an additional 50 ounces if we managed to reach Tashilunpo. Wherever he left me I was to give him a tent, pack-horses, provisions, etc., with which he and his brother might return home.

On May 27th we made our final start for Tibet, crossing on the 30th

* Barong-kure or baishing, in Tibetan Barong-kangsar, *Kure*, *baishing* and *kangsar* mean "village." Prjevalsky's *khyrma* is probably the Mongol word *kerim*, also meaning "village."

† Or Naichiyin-gol, "the River of Naichi;" *yin* is a genitive suffix in Mongol.

‡ This name is usually written on maps Golmo or Gormo. Golmot appears a better transcription. The name means "many rivers." The adjacent river called Patagonto on our maps is in reality called Baternoto-gol, "Mosquito Nest River," a most appropriate name for a river of the Tsaidam.

the range to the south of the Naichi River by the Sharakuiyi-kutul ("Yellow thigh-bone pass"), some 30 miles west of the Naichi-daban by which Prjevalsky and Carey had travelled. From the summit of the pass we saw, some 50 miles to the south, a long range of dark hills stretching east and west—the Kokoshili, or "Blue hills." To our west rose the huge snow-peaks of Prjevalsky's Shapka Monomakh, where the north branch of the Chu-mar (or Namchutu-ulan-muren) has its source, and on our left a cone-shaped snow-peak, the Amnye-malchin-mengku of the Mongols,* stood boldly out. Through the broad valley between us and the Kokoshili ran several small streams flowing into the Chu-mar, or losing themselves in pools of salt water or in the hillocks of sand with which the plain was studded. The soil was bare except for a few moss-covered tussocks, some stunted weeds against which the sands had drifted, and here and there a blade or two of coarse and brittle grass pushing its way through the sand. A few wild asses, some antelopes, and a stray bull yak were the only living creatures we saw in this broad expanse, which it took us three days to cross.

Passing over the Kokoshili on June 5th we continued in a south-west direction, making for the western extremity of the Dungbure ("Conch shell") range, whose rugged peaks rose 60 miles away to the south of us, occasionally above the snow-line.

Between these mountains and ourselves several low ranges of red sandstone broke the intervening plain. Grazing was better here than to the north, but the weather was bad, the wind so violent, the snow-storms so frequent and severe, that we could make but little headway. On June 1st the grass was entirely covered by snow, and all hands had to turn out and scrape it away to give our animals a chance of getting something to eat. Samtan Jalang, frightened at the uninterrupted bad weather we had had since leaving the Naichi valley, suggested that we stop over for a day for him to perform the storm-dispelling ceremony at which, he modestly stated, he was most proficient. To this I readily agreed, and at the same time we decided that henceforth we would ration ourselves at one cup of tsamba a day for each man, and 5 lbs. of tea a month for the party. This was made necessary, as the Mongols and Chinese are such enormous eaters that, if left to themselves, they can devour in a day what would satisfy ordinary appetites for five.

On nearing the head of the Namchutola River, and the end of the Dungbure Range, we came upon some small lakelets surrounded by an abundance of grass growing in tussocks. On the adjacent hills were herds of wild yak and asses; and so, though the weather was vile, we rested here for two days; and I shot a fine ass, on which the Mongols

* Possibly Prjevalsky's Mount Subeh. His Columbus Range and the west portion of his Marco Polo Range the Mongols call Kobche-ula. The east portion of his Marco Polo Range they call Konchong-kutur. Namchutu-ulan-muren means "the red river of the meadow."

feasted; but my Mohammedans would not touch it, though they looked on with envious eyes as the others gorged themselves with the savoury meat. Leaving this camp, we crossed a low range of red sandstone hills, and the main chain of the Dungbure was before us. To the west was a "massif" of snow-peaks, and at its southern base a large lake we called Trashi-tsonak ("Lake good luck"). Beyond, as far as we could see, a maze of mountain-peaks, few of which, however, were covered with snow.

In fact, throughout the journey across this high plateau, I was surprised to find so few snow-peaks. No chain, except the Dang-la, rose much above the snow-line, which my observations fixed at about 17,000 feet above the sea-level. Nor do I believe that I saw on the whole journey through Tibet a single glacier, though there was much *névé* on the Dang-la and other chains farther south.

On June 16th we crossed the Dungbure Range, and from the south slope, where we camped, I saw the Buha-mangna ("Yak head") mountain, along whose eastern side runs the high-road to Lhasa, rising amidst a confused mass of low and short ridges, all trending approximately east and west. Over these we picked our way, the weather for a while warmer—so that we left off for a day or two our heavy sheepskin gowns—and we found green grass and some little primroses in sheltered nooks. On the 18th we camped on a feeder of the north branch of the Toktomai ("Gently Flowing") River, and that day was one of rejoicing, for it was the first since leaving the Naichi-gol—twenty-three days before—that we had had neither snow, rain, hail, nor wind, though I am fain to admit that it hailed not far from us, and that we repeatedly heard the crackling thunder peculiar to these high regions, and that shortly after sundown it blew great guns, and, finally, that a heavy white frost covered the ground when we arose the next morning.

Crossing the two branches of the Toktomai, which meet at the base of the Buha-mangna, we saw from the low hills to the south the high and snow-capped Kurban-habsere,* a shoulder, as well as I can judge, of the Great Dang-la. We were now in the basin of the Murus ("*The* River"), the Drechu of the Tibetans, the head-waters of the Yang-tse-kiang, into which all the rivers we had crossed since leaving the Tsaidam find their way. The country was mostly of limestone formation, grazing was good, and game plentiful, but so wild that I could not approach it; and, longing for a change of diet from the invariable menu of tsamba, we made a rolly-poly stuffed with wild leeks, the only luxury the place afforded.

* Kurban-habsere or "the three habsere;" Atak-habsere or "Lower habsere" (probably Prjevalsky's Mount Dorsi), Tumta (or "Middle") habsere and Eken (or "Upper") habsere. To the north-east of the Atak-habsere we saw a high snow-peak, called by my guide Satokto-san-koban-mengku (Bad-boy snow-peak?), which I took to be Prjevalsky's Mount Joma.

I think I have dwelt long enough on this region, its climate and bareness, to give an idea of it. Until we reached the tents of the Namru Tibetans, in July, it changed in no appreciable way. The soil was sandy or alkaline, of limestone or granitic formation; but for ever our route was over low hills or down broad valleys with just enough grass to keep our animals from dying, and fuel so scarce that we could barely find enough dry yak droppings (*argol*) to make our kettle boil.

Twice we crossed the Murus, the second time so near its source that we could see, a few miles away, the little rivulets dashing down out of the snow-clad mountains to form the stream we were fording, and which was not over 2 feet deep, though we were in the midst of the rainy season.

Our route led in a westerly direction along the base of the Dang-la till we came to the extremity of this great range, and found ourselves on the vast lake-covered plateau which some 600 miles further west becomes the Pamir, but is here known to the Tibetans as the Naktsang.* South of the Dang-la we were in Tibet, for the desert we had just crossed is a no-man's land, once inhabited by a few bands of Golok, who found it a convenient lurking-place from which to pounce on caravans travelling to or from Lhasa or on Mongol camps in the Tsaidam, but now deserted. A few stone hearths and rough altars, on which to burn juniper spines at the New Year, alone attest the former presence of man in this deserted waste.

On July 2nd I distributed the last of our tsamba and tea, enough for eight days, if used with the greatest economy; but of this self-denial I had but too good reason to believe my men incapable, and events fully justified my fears—in two days it was devoured, and I had to give them all my scant supply of tsamba and granulated cheese (*chura*), reserving only for myself about a pound of flour and a little tea on which to reach the first Tibetan camp, wherever that might be.

July 4th found us on the top of a pass leading from one to another of the numerous lacustrine basins through which we were for ever going. There was a lakelet here half covered with ice, a few sheldrakes and ducks were flying about, and bunches of coarse grass covered the spongy soil on which the snow was melting. Our pack mules could go no farther, so here we pitched our tents by a little rivulet that trickled down from the red cliffs beside the road, and while gusts of icy wind

* The importance of the Dang-la, which in lat. 33° stretches from long. 90° E. to 97°, on the climatic conditions of the Tsaidam and north-east Tibet, cannot be over-estimated. With an average elevation of probably some 20,000 feet above sea-level, it intercepts the moisture-laden clouds driven from the south-west by the monsoon. While its northern slope is a comparatively dry, arid waste, its southern is during nearly half the year deluged with rain, hail, or snow. The high, rugged range to the east of the Dang-la and to the south of the Upper Hwang-ho (Soloma) exercises a similar influence on the climate of east Tibet. See 'The Land of the Lamas,' p. 174.

swept rain-laden clouds to us, driving the pungent smoke of our fire of wet argol into our inflamed eyes, we huddled together around the little blaze to drink a cup of tea made with muddy, brackish water, and solace ourselves with a pipe. On July 6th we came to the Tsacha-tsangbo chu * flowing westward into the Yirna-tso, which we could see some 20 miles from our route. We had much difficulty in crossing the swollen turbid stream, wading through its swift current, holding up the loads of our mules, and dragging them as fast as we could through the soft sandbanks which divided the river into half a dozen channels, and guiding them around the quicksands. On the south side of the river signs of habitations were everywhere visible in the low walls of cow-dung, which the Tibetans build inside their bleak, cheerless tents to keep out the wind; but still, look where I might, I could see no tent or flock of sheep. So once more we drowned our mighty minds in tea, and without food for the third day lay down in our clothes, now soaked for the last forty-eight hours by the incessant rain, to dream of the fat mutton and buttered tea which did not come. The next day we pushed on, making for a pass in the low mountains before us, and we had not gone many miles when we saw a number of yak and a little flock of sheep wandering over the hills, and then, in a nook, we discerned what we longed to find, and still dreaded to see—two Tibetan tents.

We entered the valley leading to the pass, and camping a mile or so from the tents, I sent Samtan Jalang and my headman to the nearest one to buy some food and ask our road. Soon they returned with a sheep, some butter and cheese, and the news that we were two days west of the Amdo-tsonak, and about the same distance from the north-west corner of the Tengri-nor, or, as these Tibetans called it, the Drolma Nam-tso.†

The people to whom my men had spoken belonged to the Namru tribe, and were under the rule of Lhasa, as were the Amdo, their neighbours to the east. They begged my men not to mention that they had sold them anything, as they had received the most formal orders to hold no communication with travellers coming from the north, a quarter they never visited save when going to the salt lakes we had passed a few days previously. The questions the Jalang had asked greatly excited their suspicion, "for," they reasoned, "if you do not know the country, what are you doing here?" So it was only after making the women of the family some presents of buttons and looking-glasses that he learnt the details I have just given.

The next day we crossed the range, getting from the summit a

* The Zacha Sangpo of our maps, but there placed some 51′ too far north. See map accompanying supplementary papers of the Royal Geographical Society, III., Part 1.

† Drolma Nam-tso, "The Heavenly Lake of Drolma." Drolma, or Dolma, is the name of the deified Chinese consort of the Tibetan King, Strong-tsan-gambo. She is one of the most popular deities of Tibet.

beautiful view of the Namru-tso, a good-sized lake of azure hue, and far to the south of the snow-capped ridges of the Nyin-chen Dang-la, the mountains between the Tengri-nor and Lhasa.

A broad valley lay before us dotted over with tents, and herds of black cattle and flocks of sheep, a low range of reddish hills closing it to the south, and hiding the Tengri-nor from our view. We were now in the midst of the pasture-lands of the Namru and on Lhasa soil, so I braced myself for the war of words which I felt must soon begin. That night we camped near some tents, where we found Lhasa traders stopping, who offered to sell us tsamba and other necessary supplies on the morrow.

Late at night a beggar, whose tent was only a stone's throw from our camp, came and offered to take me to Shigatse in six days. The first four, he said, we would travel through uninhabited country, but after that tents (*drupa*) would be numerous till we reached the Tsang-gi-tsang-bo in front of Tashilunpo. During the day some other people had come to see me, but I had shut myself in my tent pleading inflamed eyes, and only saw them at night, when they could not clearly distinguish my features. They left me, however, with the evident impression that something was wrong about my party, that our ignorance of the roads was suspicious, and that our story of having lost our guide and strayed from our route was not a thoroughly satisfactory one. I went to sleep that night with an uncomfortable feeling of impending trouble, to which I had added the irritation resulting from a violent row with my Mongol guide, whose impudence had steadily increased as time went on, and he felt how important he was to the success of my undertaking.

The next morning by daylight I was awakened by shouts of the Tibetans calling to my men—as is their custom when wishing to enter a tent, to hold the dogs while they came in to see me. The spokesman of the party, a jolly-looking, dirty-faced fellow with long locks of greasy, curly hair falling on his shoulders, and dressed in a gown of the finest purple cloth, saluted me by sticking out his tongue, and making a deep bow with both hands held out towards me, then squatting down, he asked me to remain camped where I was until the Deba of the tribe could come and talk with me. They had all received orders from Lhasa to allow no one to pass through the country. The year before last (1890) the Prince of the Tongut Mongols had been stopped here when on his way to Lhasa, and only allowed to proceed when his passport had been sent there and found *en règle*. His had been the only party which had ever come here from the north. He offered to supply me with food and everything that I might require, for which he could accept no compensation, if I would comply with his request; otherwise I could have nothing. I was obliged to accede to his demands; without food of any kind, I was absolutely at his mercy. While we were

talking I noticed horsemen coming in from every quarter, each with a long matchlock slung across his back, a big sword passed in his belt, and not a few with bows and arrows besides. Before an hour some sixty or eighty of the tribesmen were squatting around fires all about our camp, drinking tea and watching us. My men now felt sure the end had come. They had all heard that death awaited, not only any foreigner who might try to enter the Lhasa country, but all his followers as well. The wild looks and warlike array of our guards filled them with terror. The Mongols passed the day burning sheep's shoulder-blades to divine their fate; a little Halha Mongol Lama, who had joined my party in the Naichi valley, chanted his litanies with wild energy, and my Chinese, with characteristic stolidity, ate their fill and asked that death might come quickly if Heaven had decreed they should now die.

The day following the Deba arrived, preceded a few hours by three officials from Lhasa, who happened to be in these parts collecting tithes for the Tale Lama. The long talks between us which followed during the next three days, the endeavours made by the Tibetans to induce me to go back the way I had come, their efforts to frighten me by pictures of the dangers of travelling in their country, dangers alike from man and the elements, it would be wearisome to relate. I begged them to give me provisions enough to go around their country to the west and thus reach India, telling them that we had only come to their country by accident, pressed by hunger and in ignorance of the roads, that I had no inclination to travel in Lhasa governed country, for my object was to reach Darjiling, not their capital. To all my arguments they opposed but one answer: "If you do not leave this country by the way you came, off will go our heads, for the laws of Lhasa cannot be disobeyed." I produced the passport of the Tsung-li Yamen; the big red seal on it impressed them a little, but as they could not read Chinese, it had very little value. I scored a point, however, when I told them that, after all, my proceedings did not concern them, that, travelling under Chinese protection, it was for the Amban at Lhasa to say what I should do and where I should go. Since they would not listen to me, I would send one of my men to Lhasa to ask that Chinese officials be sent to confer with me here. In consequence of this the Deba conceded that I might go to Nagchuka on the highroad to Lhasa from Hsi-ning, and there talk with the Kanpo, to whom he would despatch a courier advising him of my coming. I would travel by the valley of the Tsang-bo-chu to the north, while the messenger would take a direct and shorter route, and so I would experience no delay. This project suited me fairly well. I had now reached a point where my route nearly overlapped that of Nain Singh when travelling in 1874–5 to Lhasa from Shigatse around the Tengri-nor.* The road I would

* Nain Singh calls this country De Namru. *De* means "district."

follow, if allowed to proceed southward, was that surveyed by this most careful explorer, so I could not hope to add much to our knowledge of the country. If, on the other hand, I followed the route suggested by the Deba, I should see a great deal of new country. So I made up my mind that Chamdo and Ta-chien-lu would be henceforth my objective points, and that I would endeavour to reach at least the former place by routes heretofore unexplored.

My two Taichinar Mongols refused to go any further with me than Namru, and I was heartily glad of it; they had been of very little use since we had left the Murus behind, as the country was new to them—they were timorous to a degree, enormous feeders, and extremely lazy. I gave them their wages, a tent, a kettle, a couple of ponies, and enough food to last them two months, and they left at once in great hurry to get their heads out of the lion's mouth.

On July 13th we broke up camp in the Namru valley, and began our long march eastward. Just before leaving I gave the Deba a *k'atag* (ceremonial scarf), and thanked him for his courtesy and kindness. He said that, as for himself and his people, they would be well pleased to see foreigners visit their country, for they had many things strange and beautiful to sell. Moreover, he now knew that foreigners were not the bad men the Lamas always made them out to be, for I had used smooth words and shown myself amenable to reason; "but," he added, "we Namru are not our own masters, and have to obey the orders of the Lamas of Lhasa, who are bad and cruel. Should we disobey"—drawing his hand across his throat—"off would go our heads!" During my whole stay in the Namru valley, every one had been most polite and anxious to please me. I had been supplied daily with every delicacy of the Tibetan cuisine—sour milk, clotted cream (*pima*), tsamba, mutton, and buttered tea—which our long fast prevented us for days from enjoying, and the Deba had made me many presents, among others a good saddle pony, and now I left with an escort (or guard) of ten soldiers, resplendent in purple gowns, high, wide-brimmed summer hats, and all their many silver-mounted arms and accoutrements.

We followed the road by which I had come till we reached the Tsangbo-chu, which we crossed this time by a good ford, and then for three days we kept up the course of the river over a soft gravelly soil with tussocks of grass and bits of bog, through which we had much difficulty in picking our way. To add to our discomfort, there were violent storms of rain and hail daily, drenching us and our belongings, and making it most difficult to find a little fuel with which to boil our tea. The escort was worse off than we, for we had a tent, while they had nothing but their big saddle blankets in which they wrapped themselves on the approach of a storm, and supperless went to sleep. When the weather was fine they fared, however, sumptuously. On reaching camp five or six went foraging for fuel, two others filled the

kettles, and others started the fires with big goatskin bellows. The little troop was divided into two messes, each with its kettle and bellows, while every man carried his supply of tsamba, dried mutton, tea, butter, clotted cream, and wheat cakes; also a little earthenware pot in which to boil his tea. While the tea was boiling, they drank a cup or two of (*tarak*) clotted cream; then, having well licked their wooden bowls, they fell-to—tea and tsamba as first course, tsamba and tea as second, and buttered tea as dessert. When they had finished eating, they sat till bedtime talking, twirling their prayer wheels, and twisting yarn, their only amusements, for games, with the exception of knuckle-bones, are, I believe, unknown among them.

Occasionally we caught a glimpse of snowy mountains far away to the north, but most of the time we could see no farther than the low hills on either side of the valley.

On the fourth day after leaving the Namru camp, we passed out of the valley of the Tsang-bo-chu over hills of soft wet gravel, in which we sank to our knees, and entered the basin of the Chang-tang-chu, which I am inclined to consider the westernmost feeder of the upper Jyama-nu-chu. From this point we took a slightly southerly course, skirting the foot hills of a range some 20 miles distant, running parallel to our route. The weather grew worse, and the trail worse, if possible. Frequently we had to ford swollen streams, to drag our foot-worn horses through miles and miles of mud; sometimes, even, we rode in river beds, the only place where we could find a solid foothold. For ten days we pushed on amidst every kind of discomfort, burning our pack-saddles to dry our soaked clothes and warm our limbs—stiffened by the cold and incessant downpour.

At last we reached *terra firma* and camped near a pool in the hills not far from the stream, the Dang-chu, flowing southward, and then the Namru showed me to the south Mount Bumza and the road to Nagchuka, and with a hasty good-bye, fearing lest they might be attacked by some of the people of the country with whom they had a long-standing feud, they rapidly rode off.

We had not gone a mile along the high-road when we saw horsemen and pack-mules travelling south, and coming up with them, I found that they belonged to the great caravan which annually at this season goes to Lhasa from Tankar and Kumbum with horses, mules, and Chinese goods to be sold in the Tibetan metropolis. There were about two hundred men in the caravan, and many of them had known me at Kumdum. They were aghast at the meeting, so near Nagchuka. If we arrived at that place together, they would be refused permission to proceed on their journey, for they would be undoubtedly suspected of having guided me there and otherwise assisted me in evading the universally known orders against foreigners. We talked the matter over, and, as it really was indifferent to me whether my progress south

was arrested here or a few miles further on, I told them to send men ahead and notify the nearest post of soldiers that a foreigner was coming, and that they disclaimed any knowledge of his movements and had nothing to do with him. In the meantime, I and my little party rode on some fifteen miles, and camped in a sheltered nook in the gravel hills which bordered the wide river bottom.

Towards evening, six or eight soldiers rode up and asked me to oblige them by remaining camped where I was until the Nagchu Pinbo could come and see me. To this I readily agreed. Some rest was absolutely necessary for the horses, now in a terrible condition, so worn were their hoofs and so lame, that they could hardly put one foot before the other. The next day two Tibetans from across the river came into camp, and from them I learnt that their country was a part of Jyade, a province under the rule of the Chinese Ambassador residing at Lhasa. I sent my headman back with them to buy a sheep and some tsamba, and when he returned he was accompanied by the chief, the Pere Pinbo. He asked me where I was going, and I told him my story and of my desire to reach Chamdo. He invited me to come over to his country, saying that he would do all he could to assist me, exchange my worn-out horses and mules for fresh ones, give me food in plenty, and find me a guide. So it was decided that as soon as I had seen the Nagchu Pinbo I should cross the river and accept his proffered assistance.

It was the 26th of July when the official from Nagchuka, accompanied by a number of chiefs, soldiers and retainers, arrived at my camp and pitched his tent near mine. I passed the day talking to them of my plans, of which they had no concern, as my route would lie wholly outside their territory, and on the morrow I bade them good-bye and crossed over the Dang-chu to the Jyade side. The Jyade (*Rgya-sde*) or "Chinese province," extends from east to west over 200 miles and more of country between the Dang-chu and Chamdo, with a probable breadth of 60 or 70 miles; touching to the north, the Dang-la and its eastern branches, and to the south, bordering on the Lhasa governed provinces of Larego, Shobando, etc. Its people have from the oldest times professed the Binbo religion (a form of the devil worship or Shamanism, which has, at one time or another prevailed over most of Asia), a creed not tolerated in the kingdom of Lhasa, which tried for a long time to crush it out of these regions. When, in the 17th century, the Chinese assumed control of Tibetan affairs, they put a stop to the incessant warfare between these two countries by forming a separate province of all the Binbo principalities, and putting it under the supervision of the Emperor's Amban at Lhasa. This province was called Jyade. Thirty-six chiefs or Debas, chosen from among the most influential headmen of the country, are appointed by the Amban, and are in receipt of a yearly stipend from the Emperor of one hundred

ounces of silver. Under these rule numerous chiefs of clans whose charges are hereditary.

Nearly the whole of Jyade is pasture-land above the timber-line (in this latitude about 13,500 feet above sea-level). The people, though poor, appeared to me more light-hearted and freer in their manners than any I had yet met with in Tibet, and this I attribute in a great measure to the absence of large lamaseries in their midst, whose inmates would keep the people in a constant state of perturbation, and crush themunder endless exactions of all kinds. Binbo lamaseries are neither large nor numerous, and the Lamas of this faith with whom I have talked surprised me by their liberal views and readiness to accept new ideas. My favourable opinion of Binbo Lamas was confirmed later by the French missionaries at Ta-chien-lu, who told me that in south-eastern Tibet their work had been greatly facilitated by the good-will and assistance they had received from Lamas of this religion.

The importance of the Binbo religion has not, I believe, been heretofore suspected. All along the eastern borderland of Tibet, from the Kokonor to Yun-nan, it flourishes side by side with the lamaist faith. In Jyade, where there are certainly fifty thousand people, it rules supreme, and in all the southern portions of Tibet, not under the direct rule of Lhasa, its lamaseries may be found. So it seems that this faith obtains in over two-thirds of Tibet, and that it is popular with at least a fifth of the Tibetan-speaking tribes.

In dress and in their mode of living the Jyade differ in no appreciable way from most of the Tibetan tribes leading a semi-pastoral life. In features they resemble other Tibetans, the Lhasa and Shigatse people excepted, who are unquestionably of mixed breed, the men about 5 feet 6 inches in height, of rather slight build, with thick and usually wavy hair falling on their shoulders, to which many add the Chinese appendage of a huge queue of false hair, on which they string finger-rings and a great variety of ornaments fastened to a band of red cloth. The nose is thin and aquiline, with frequently a broad end, the teeth strong and irregular, the eyes usually well set and large. The women are not appreciably smaller than the men, and of about the same build, the younger ones frequently good-looking, but disfigured by the black paste (*toja*) with which they smear their faces to protect their skin against the wind.

The clothes of both sexes consist in a single gown with a high collar—in winter of sheepskin, in summer of *pulo* (native cloth), violet for the men, blue for the women. Sometimes they also wear a light shirt of silk (*buré*), with a high red collar. Boots with cloth tops, fastened below the knee by broad garters, complete this rather picturesque though clumsy dress. The women wear their hair in a great number of little plaits, falling over the shoulders like a cloak and reaching below the waist. Down the middle of the back is fixed a

broad band of red, green, and other coloured stuffs, on which they sew ornaments of silver, turquoise, coral, or any ornamental knick-knack they may own.

The day after reaching the Pere Pinbo's camp he brought to see me Nor-jyal-tsan ("The Standard of wealth"), the Horgo Deba, the great chief of this section of country, and who was about to leave for his home on the Su-chu, some eight days' travel to the east. After a long talk it was agreed that I should go with him; and he promised me protection and a guide all the way to Mer-jong, the first village on Chamdo territory. I presented him with fifty ounces of silver and a few odds and ends, all of which greatly pleased him. "If the sky falls," he said, "it shall strike me alone; you shall not suffer."

Our route led us in a general east-south-easterly direction across the numerous rivers which, coming down from the great mountains to the north, form the head-waters of the Jyama-nu-chu, supposed to be the Upper Salwen. The country was fairly well peopled. We passed every mile or two clusters of tents, near which were herds of yak and little flocks of sheep and goats.

On August 5th we reached the Su-chu, held by the natives to be the main stream of the Upper Jyama-nu-chu, here about 75 yards wide and 8 or 10 feet deep. We crossed it slung by the middle to the raw hide cable which spanned the river, fastened to big rocks on either side. Our luggage was got across in the same way, and the horses swam. Here, at an altitude of 13,700 feet above the sea-level, we found the first village we had seen in Tibet; and I noticed also a few patches of barley. Rhubarb was so very abundant on some of the hillsides that frequently we saw the stalks used to roof the little stone huts the people build hereabout as storehouses adjoining the tents in which they live.

We came on the 10th to the I-chu, the largest river we had yet seen, and which we had great difficulty in crossing. Then we reached the Rama-chu and saw the mountains covered with trees—stunted cedars and pines. Leaving behind the pretty Batasumdo valley, we came, on the 16th, to the Seramdo-chu, where hamlets, resembling from afar our old mediæval castles, crowned every hill, and the whole valley was green with fields of waving barley. This river we crossed in the same manner as the Su-chu.

On August 18th we camped in Nar Peihu, the birthplace of my protector the Deba Nor Jyaltsan, and a few miles below the big village of Chebo Tenchin on the Ze-chu. Here in the night, and with much mystery, came to me a man of Chebo Tenchin, who showed me a sheet of very soiled foolscap, asking me to translate the lines written on it, and which a *pyling* ("foreigner") had given him a few months before. It was a certificate by H. Bower, Captain 17th Bengal Cavalry, stating that the bearer had supplied him with transport, fuel, and fodder, and was dated December 17th, 1891.

When on the Su-chu I had heard that in the first month of the year a party of foreigners coming from the west—no one knew where—had passed eastward by a route parallel and to the south of the one I was following. Their dress, habits, and especially their black cook, had been so minutely described to me that it had left no doubt in my mind as to the truth of my informant's story; and now it was confirmed, and our roads, starting from such widely separated points as Leh and Peking, had finally met in the heart of Tibet.*

While camped in Nar Peihu I noticed many articles of peculiar excellence of manufacture, blankets, baskets, silver and iron work, also red peppers and remarkably fine wheat flour. I learnt on inquiry that they came from Po-ma, or Lower Poyul, a country some sixteen days to the south, and which the Jyade people frequently visit. But very little is known of this country, so I hope a short digression on the subject will be pardoned me. Poyul comprises two districts, Upper and Lower Po, Po-ti and Po-ma. The upper, or mountainous, section of the country is inhabited by a lawless lot of herdsmen; but the lower is an open country, where the climate is warm and the soil fertile, so that with Derge it is held to be the richest region of Tibet. Its present manufacturing pre-eminence is due to a singular cause. During the war between China and Nipal in 1792 a detachment of Su-chuanese troops was sent to the seat of war by way of Pomi, a country nearly unknown at the time to the Chinese. Arriving here, no route could be found leading to Nipal, and struck by the beauty and fertility of the land the soldiers deserted *en masse*, and marrying the women of the country they settled here. 'Tis among the descendants of these Chinese that the beautiful blankets, the fine silver work, and the famous Pomi horses are found.

The whole of Poyul is independent, though nominally it is under the high control of the I-Chin-chai or "Envoy to savage tribes living at Lhasa; a Manchu officer who is colloquially called 'the Third Amban.'"

On August 20th I reached Mer-jong, the first village or rather lamasery, on Chamdo territory, and here we said "Good-bye" to our faithful guide Aniang, the headman of my friend Nor-jyaltsan, who, with his master, had proved himself a true and steadfast friend. Had it not been for the assistance these two men gave me, I should probably have had many difficulties to encounter, but thanks to their untiring kindness I travelled in comparative comfort and without a single disagreeable incident.

Two days after leaving Mer-jong we came to the town of Riwoche

* Between the Namru country and Mer-jong Captain Bower's and my route frequently crossed each other, and along a part of the way were the same, although the names differ. On his map Khemo Tinchin figures as Chumbotinsi. Mer-jong is near his Kezalomba and to the east-south-east of it.

on the Tse-chu, a place famed for its beautiful temple and its picturesque situation at the foot of steep forest-covered mountains between which winds the broad, swift river, here spanned by a substantial bridge of huge pine logs. The Riwoche province belongs to Lhasa, and the Lamas viewed my visit with sullen discontent. From this place we followed the river down for two days, and then came to the Chinese post-station of Nyulda (En-ta, in Chinese), where the soldiers gave us the first fowls and eggs, cabbage and turnips, we had seen for many a long month.

I was not over two days and a half from Chamdo, where we hoped to be able to buy new clothes and replenish our nearly exhausted supplies with some of the good things with which we had been told the Chinese shops of this important town were full. On August 26th we reached the Sung-lo zamba, a fine bridge over the Tse-chu, by which Bonvalot and his party were led around Chamdo in 1890. Here I was met by a high Lama official, who suggested that I should take the same route, and not enter the town, in which the people, and especially the 3000 Lamas of its great monastery, were very hostile. I objected to this, telling him that, as I had come to examine the country, I could not think of going over a road already followed by foreigners; so, after a day spent in arguing the point, he gave me guides and pack animals (*ula*) to go through the southern part of the country as far as Pungda (Pao-tun of the Chinese) on the high-road to China, near where he would meet me with all the many supplies, clothes, etc., that I required, and fresh ponies in exchange for mine.

Our route lay at first over steep and high mountains, then down a valley covered with the most beautiful pine trees, their branches draped in long, cobweb-like moss of light yellow and bright orange. There were many silver pheasants in the thick underwood, and the yak drivers told me that bears, leopards, and wolves were frequently found here. Leaving this behind, we passed into another valley of great beauty, in which I found nearly every variety of tree and wild fruit known to Tibet—cedars, junipers, cypress, pines, and maples, plum and apple trees, cherry and apricot, raspberries, both the orange and red varieties, strawberries and currants.

At Kinda, a little hamlet on the Om-chu at the mouth of this valley, I found the Chamdo Lama waiting for me with all the things I had asked for, and a variety of presents from the Papa Lha, the ruler of the country, thanking me for having complied with his request not to enter the town. From this point I followed the bank of the Om-chu for a day, and then crossing the river on a raft of heavy logs, we climbed the steep Pung-la, and saw from its top the little post-station of Pungda and the highroad to China as it wound up the sides of the Ipi-la, the limestone crags along its summit riddled with holes, so that the Chinese have called it Ku-lung-shan, or "the mountain of holes."

From this point on I could stop every day in the Chinese post-stations (*tang* or *kung-kwan*) kept along this route by the Imperial government for travelling officials and couriers. The men stationed in them cultivate patches of cabbages, turnips, greens, and tobacco frequently on the roofs of their wretched dens, and in the yards of the little compounds a few fowls drag out a miserable existence, and pigs wallow in the mud which is ever to be found around Chinese quarters. All these soldiers have native wives, whom they say are better than Chinese, for they do *all* the housework, and the husband only has to look after the babies and smoke his pipe. Many of them had been in Tibet twenty or thirty years, and still saw no chance of getting back to their native land. The journey home must be made at their own expense, and they are never able to save a cash of their miserable pay. In fact, most of them are paid in brick-tea at a valuation put on it by the commissary of Batang or Ta-chien-lu, usually double the price for which they can sell it to the natives, who pay them in butter or tsamba, mutton, or yak meat, and so, as they said, "we never even see a bit of silver from one year's end to another."

Crossing the Ipi-la, we were on the territory of Chamdun (or Draya), an independent state ruled by a high ecclesiastical dignitary with the high-sounding title of Chab-gon Rinpoche Lepe-sherab. At the foot of the pass I found a gorgeous Lama and a numerous suite awaiting my arrival. He was a secretary of the great Lama, and had come all this way to beg me not to come to the town. I met all his arguments in favour of other routes by a flat refusal, and, pushing on ahead of him, reached Draya in two days and a half. I stayed here a day to make friends with the people, talking to them and showing them my few belongings. By this means I here and elsewhere got information which direct questioning would never have elicited, for Tibetans, like all Asiatics, are too suspicious to admit for a moment that curiosity can be the only motive that prompts a man to question them about their country, its products and customs.

Between Draya and Gartok (Chiang-ka in Chinese) the country did not vary from what we had seen since entering Chamdo territory—narrow valleys and lofty mountains, some covered with forest growth, others with only grass and wild flowers, others, again, with their peaks deep in snow. The valley bottoms were generally cultivated, thorn hedges enclosing each little field. The houses were nearly hid under the golden mass of wheat and barley drying on high frames erected on the roofs, and from the ends of the rafters swung ropes of drying grass, or strings of turnips. The people differed from one to another canton chiefly by peculiarities of language and the shape of their arms and ornaments. We met very little traffic, only one or two small caravans, none going far west; and I learnt with astonishment, for it was far from what I was prepared to hear, that the trade between China and

Lhasa is mostly over the road through the Horba and Derge countries I had followed in 1889. The road we were on is used by Chinese, and has importance for them alone, as they find shelter and protection at the military stations along it. In this connection it is curious to find bands of mounted robbers—the Shanghe (or Sanghe) Chakba—attacking caravans along this route, between Draya and Batang, at the same localities where their forefathers did in the reigns of Kang-hsi and Chien-lung. Ten or fifteen Tibetan soldiers always joined my Chinese escort when we had to traverse any of these robber lairs; and though we never fell in with any, every one vouched for their audacity and ferocity. These Chakba have no legal status—by that I mean that, having been nominally exterminated a few years ago by the military mandarin of Batang, no further notice can be taken of them—and they can carry on their brigandage without fear of the guardians of the high-road on which they operate.

Gartok, which I reached on September 10th, is the capital of a province of Lhasa called Merkang (or Merkam), with its northern boundary 50 miles to the north-west, on the road to Draya. I was most hospitably received by the lieutenant in command of the Chinese garrison, who was a Mohammedan from Ta-chien-lu, and a relative of people I knew there.

Leaving this place, I reached Batang on the 15th. I was much surprised to find this large place of no commercial importance. Hardly any trade passes through it, and there are only two small Chinese firms doing business here.* The bulk of such trade as there is is in the hands of the Lamas; but they prefer the pawnbroking business, and to lend their money to Chinese at Litang and Chamdo, on whose integrity they can count, and who pay them a high rate of interest. I was detained here three days trying to get the Commissary (*Liang-tai*) to cash a cheque on the missionaries at Ta-chien-lu; but he refused in a most offensive manner, and I had with him the only row I have ever had with a Chinese official. At Batang my surveying work was at an end; and it was with a sigh of relief that I closed my field-book and packed up my prismatic compass. On September 24th I reached Litang, to find the place in a wild state of excitement. There was war between Litang and Chung-hsi over a question of the cultivation of pasture-lands by the latter tribe. Some five thousand soldiers were camped below the town. A fight had already taken place a day or two before, and the spoils of battle—yak and sheep—were herded in the adjacent meadow. I stopped for two days in the Chinese Yamen, and

* The war at Litang had certainly much to do with the complete cessation of travel on the road between Batang and Ta-chien-lu, but still I do not think that this can invalidate what I have previously said about the bulk of the trade passing over the Derge route. I was assured by a number of Chinese traders between the Seramdo chin and Chamdo that such was the case.

then set out for Ta-chien-lu, where I arrived in six days, to be welcomed by my good friends the Fathers of the Mission of Tibet, whom I found waiting for me, as news had reached them two days before that I was on the way.

Here, on the eastern border of Tibet, my journey was practically ended, for, though several thousand miles still separated me from the seaboard, they could be travelled in comfort and with rapidity. Leaving Ta-chien-lu on October 5th, I was in Shanghai on the 29th, exactly eleven months from the time I had left it. In this time I had travelled about 8000 miles, surveyed 3417, and, during the geographically important part of the journey, crossed sixty-nine passes, all of them rising over 14,500 feet above sea-level. I had taken series of sextant observations at a hundred points along the route, made three hundred photographs, collected between three hundred and four hundred ethnological, besides botanical and geological, specimens. For two months we had lived soaked by the rains and blinded by the snow and hail, with little or nothing to eat, and tea as our only beverage; and yet not one of us had a moment's illness from the day we left till we reached our homes again.

From Kalgan to Batang I ran a traverse on an approximate scale of 4 statute miles to the inch, using for that purpose a prismatic compass, and taking the distances with a watch, controlling three or four times a day the rate at which I was travelling by counting my steps (of 30 inches), now on a level road, then going up and coming down hill. I took on an average one bearing to every 1½ miles along the route (about 2500 in all), besides as many side sights as possible for triangulation. On the summits of all passes, at all river crossings, watersheds, etc., the aneroid barometer was read, and throughout the journey, at 7 a.m., 2 p.m., and 7 p.m., the atmospheric pressure, the temperature, and the condition of the atmosphere (clouds, wind, etc.), were recorded. At each camp the altitude was determined by the boiling-point of water, and aneroid readings between two consecutive camps have been compared and corrected by them.

Sextant observations for latitude and time were taken whenever the weather allowed. As I was most anxious not to attract the attention of the people, I only occasionally observed the sun, doing nearly all my work at night. Every three or four days, when the weather served, I stopped for a day or two to get a rate for my watch, and at some six or eight points along the route I made daily observations (equal altitudes of sun, stars, observations for sun's azimuth, etc.) for periods varying from five to fifteen days.

As far as I have been able to compare my work with that of previous travellers, Prjevalsky to the north and Gill to the south, the results are very satisfactory, though of course I lay no claim to great exactitude for any portion of my work; it is but a preliminary reconnaissance executed alone, and under considerable difficulty.

Before the reading of the paper, the President, Sir MOUNTSTUART GRANT DUFF, said: We are always particularly glad to see Americans here, but on this occasion we are specially obliged to Mr. Rockhill, because, at the request of your Council, he has come across the Atlantic, at very considerable inconvenience to himself at this inclement season of the year, simply to read this paper before us to-night. Mr. Rockhill was prepared for his arduous and valuable work as a traveller by a very considerable and varied experience of life. When only a child of ten years old he left his own country, was educated in France, spent many years there, passing among other things through the great military school of St. Cyr. After he left St. Cyr he went into the French legion in Algiers, spent there three years; then he returned into his own country, and saw a great deal on the extreme frontier in New Mexico and the neighbouring districts; after that he passed into the diplomatic service of America, and spent ten years or thereabouts in China and the countries immediately bordering on China. He was for some time Second Secretary at Peking. He was detached on diplomatic duty to serve in Korea; there he spent some time. Then he travelled very widely in Eastern Tibet, and wrote what is much the best recent book we have upon the country, which some of you know as 'The Land of the Lamas.' He then returned again to China, and made this further expedition through Mongolia, round into Tibet, very nearly reaching Lhasa, then by a great circuit regaining Chinese territory. I hope and believe that, large as his travels have been, they are by no means yet ended, and that he has a great deal more of work to do for science. Meantime it gives me the greatest possible pleasure to introduce Mr. Woodville Rockhill.

After the reading of the paper the following discussion took place:—

Sir HENRY HOWORTH: The only two claims I have to speak are, first, that I am probably the oldest friend Mr. Rockhill has in the room; and in the next place, I have written a very long and dull book about the Mongolians. In regard to Mr. Rockhill, he is now exactly what he has always been, the same modest and proficient scholar I have long known him. You will hardly guess that he is one of perhaps three men in the world who know both Chinese and Tibetan, and the only man who is known to have waded through the enormous masses of Buddhist literature of Tibet, an absolutely unknown land to all but himself. Every name in this country has more or less of romance attached to it to those who, like myself, know of its history. Here we have on this map the town of Teng-ru, the capital of Prester John, the wonderful pontiff king Marco Polo wrote so much about. The next town we come to is Ning Hia. Then we have the Non Shon country, where we are told they led a great expedition, of which we get the most romantic accounts and legends mixed up with the curious folk-lore that still survives. Then at Koko Nor you have what is perhaps the most romantic occurrence of which we know—the great migration of a people from one side of Asia to another. The Kalmuks settled on the Volga, feeling the pressure of the Russian taxes, set off on one of the most extraordinary journeys ever made by human beings, traversed two-thirds of Asia, landed north of this range, and a portion settled down by the Koko Nor. It was here they were settled at the beginning of the last century when the great fight occurred between the sacred rulers and the secular rulers of Tibet, and these Kalmuks saved the great chief Lama from the secular emperor, who had usurped authority in Tibet, and it is thus owing to these Kalmuks that the Lamas owe their present position in Tibet. I ought to say I was present last night at a house where Mr. Rockhill was describing previous travels, and showing us of what great value were the travels of Huc. Some travellers, especially Russians, have stated that he was untrustworthy, and his sentences are not always to be taken as sober prose; but we all must feel that his picturesqueness has never been excelled by

any man who has yet travelled in these regions, and I am glad to hear from Mr. Rockhill that his accounts are not only picturesque but in the main true, in regard to what he saw. I really hardly know where to end, as I hardly knew where to begin, as the whole of this country is so full of romance to me. I thank you very much for having listened to me so patiently, and congratulate you upon having this evening so excellent a traveller, so good a scholar, and one who has brought before you so graphic an account of this most interesting and romantic country.

Captain Bower: I have really very little to say about Mr. Rockhill's travels, save one thing one cannot help admiring. Whereas in my journey I was able to make all preparations in Leh in British territory, and then to start fairly across the desert, he, on the other hand, had a long journey before he reached the desert; the really difficult part of his journey was therefore very much more difficult than mine.

Mr. Delmar Morgan: The Society is much to be congratulated on Mr. Rockhill's first appearance among them this evening. For years we have heard of him and his explorations in Tibet. We have read his book and the articles published by him giving the results of his first journey, but this is the first time the Royal Geographical Society has had the opportunity of welcoming him. Mr. Rockhill's success is largely due to the pains he took to learn the language of the natives. Even as a boy he studied Eastern languages, and several years' residence at Peking enabled him to pursue his studies till he became a good Tibetan scholar. To this knowledge of the language, and to the coolness and intrepidity he displayed on critical occasions when the slightest mistake might have been a matter of life and death, Mr. Rockhill owed his success in penetrating so far into that lama-ridden country, and in learning so much of its geography.

The late General Prjevalsky, in his three expeditions into Tibet, greatly extended our knowledge of its physical geography. Mr. Rockhill has not only done this, but he has told us more than was ever known before of the religion, the politics, the habits, and the languages of that country. All this he has touched on in his paper, and our best thanks are due to him.

The President: You will, I know, instruct me to express your very cordial thanks to Mr. Rockhill for his admirable paper. It is very seldom we enjoy the advantage of listening to one who is not only a most distinguished traveller, but a most distinguished scholar. He has put at our disposal to-night a history of his travels; and I am authorized to say that he is about to assist us by editing and annotating most fully the documents we have for some time wished to lay before the members of the Society—the account by one of the Indian native explorers of a visit to Lhasa and other portions of Tibet. It would be very improper in me to sit down before I also express your thanks to Sir Henry Howorth, one of the greatest authorities on these parts of Asia; to Captain Bower, to whom we have listened so recently; and Mr. Delmar Morgan.

Mr. Rockhill's Map.—The map to accompany this paper has been reduced from the original prepared for the Smithsonian Institute by Mr. Rockhill. It is constructed from a traverse survey, positions of many places having been fixed by astronomical observations, and the heights determined by boiling-point thermometer.

The following table of Heights above Sea-level of places on Mr. Rockhill's map, will be found serviceable:—

HEIGHTS ABOVE SEA-LEVEL.

By Boiling-Point Thermometer.

		Alt. in feet.
Kalgan		2,555
	Fritsche	2,706
	Prjevalsky	2,709
Tsahan-obo		4,824
Kwei-hwa-Cheng		3,635
Hoko (Yellow River)		2,997
Chiang-pan		3,153
Ashan		3,114
San-tao ho-tzu		3,450
Kwan-ti		3,404
Shihtsui		3,665
Ning-hsia Fu		3,723
Ta-pa		3,427
Chung-wei		4,005
Ying-pan-shui		5,326
Chung-chang-tzu		7,373
Lan-chau Fu		5,167
	W.W.R. '89	5,446
	Bell	5,500
Hsin-Cheng		5,340
Hsiang-tang		5,629
Hsi-ning Fu		7,509
	Prjevalsky	7,500
	Kreitner	7,550
	W.W.R. '89	7,608
Lusar		8,907
	W.W.R. '89	9,376
Sha-erh-wan		8,861
Tsa-pa		9,332
Bayan-rong		9,269
La-mo shau-ken		7,004
I-ma-mu Chwang (Yellow River)		6,582
Fei-tzu Chwan		7,112
Kuei-Te		7,634
	Prjevalsky	7,500
Sharakuto		10,967
	Prjevalsky	11,300
Wayen-nor		10,198
Kaba Talen		9,508
Erte-chuka		10,280
Hato		10,207
Tso Kadri		9,797
Tsatsa-chuka		10,136
Muri-chuka		11,211
Wahon-jamkar		13,750
Kokosa	(by aneroid)	15,207
Tsahan-ossu (1st Camp)		13,042
„ (2nd Camp)		12,279
„ (3rd Camp)		„
„ (4th Camp)		11,555
Koko-kutul (Camp below)		12,375
Shang Chia		9,939
	W.W.R.'89	10,552
Yogoré-gol (2nd Camp)		10,791
Kawa-obo		11,845
Tosu-nor		13,179
Oim		12,533
Barong-kure		9,243
	W.W.R. '89	9,809
Shudenge		8,833
Shara-tolha		8,799
Tengelik		8,735
Bolang		8,631
Tolicken		8,715
Tsahan-kol		8,525
Naichi-gol		8,925
Kano		10,720
Tsahan-toha (Naichi-gol)		10,725
Chibeke (Naichi-gol)		11,241
Buhutai (Naichi-gol)		11,793
Tator (Naichi-gol)		12,133
Kure-bori		12,500
	Prjevalsky	12,285
Sharakuiyi-kutul		13,788
Chuwu-doksai		15,152
Elesu-nor basin		14,442
Elesu-nor, Bank of		14,497
Kokoshili-eken		15,077
Kara-daban		15,292
Olon-horgo		15,716
Namchu-tola muren (Camp 2 miles S. of)		15,471
Shire-nor		15,572
Ulan-ula (N. side)		15,898
Ulan-ula (S. side)		15,514
Dungbure-eken		15,826
Camp, June 17		15,289
Toktomai-ulan-muren (1st Camp N. branch)		14,897
Toktomai-ulan-muren (2nd Camp N. branch)		14,819
Toktomai-ulan-muren (S. branch)		14,345
Murus (2 miles N. of)		14,745
„ (1·5 miles S. of)		14,900
„ June 23 (2 miles W. of)		15,317
Camp, June 24		15,729
Camp, June 25		16,343
Dangla-eken		16,479
Camp, 19 miles W.S.W. of preceding		16,150
Camp W. of Dangla		15,891
Chib-chwang-tso (Lake Glenelg)		15,988
Camp S.W. of Chib-chwang-tso		15,807
Camp 20 miles S. of preceding		16,223
Camp S. of pass		16,355
Camp on pass, S.S.E.		16,076
Camp 21 miles S.S.E. of preceding		15,650
Tsacha-tsang-bo chu (2 miles S. of river)		14,700
Camp 8 miles S. of preceding		15,118
Namru Valley		15,018
Camp Tsacha-tsango-bo chu (July 15)		15,212
Tsacha-tsang-bo chu basin (July 16)		15,370
Chang tang chu		15,687
Camp 8·5 miles E.S.E. of preceding		15,845
Camp 18 miles E.S.E. of preceding		16,299
Camp 20 miles S.E. of preceding		15,931
Camp 15 miles E.S.E. of preceding		15,278
Trashiling (1·5 miles E. of)		14,946
Chingo		15,430
Nashe-chu		14,176

	Alt. in feet.
Camp August 1st	14,747
Song-chwang sumdo	13,364
Pon-ta	14,410
Tsega (Su-chu)	13,210
Gentse	13,345
I-chu. Here join Bower's route. His *Ita* valley, my I-chu valley	13,067
Angenong	14,157
Rama-chu	12,780
Ramnong-chu	12,672
Po-la-ga	13,672
Churema (Near Bower's Shersamdo?)	12,927
Sagotong (Ru-chu). (½ mile N. Bower's Tashiling Monastery)	12,096
Biwakanag	13,040
Laha (Nar Peihu). (Bower's Khembe Nar)	12,130
Pene-ringu	14,111
Mer-jong (Bower's Maru Camp 115)	12,711
Pomundo	13,843
Ke-chu (Bower's Kichi)	12,709
Riwoche	12,269
Tse-chu	12,061
Nyulda (Bower's Logamda)	11,942
Sung-lo-zamba (Tse-chu)	11,722
Ge	12,515
Kinda (Om-chu)	10,050
Nuyi (Village 300 feet above Nom-chu)	10,117
Pungda (Bower's Pandesar)	12,292
Bagong (Bower's Bandathing)	12,018
Kungsa	11,622
Chamdun-Draya	11,709
Ra-jong (Bower's Rajwa) (1 mile below)	12,560
A-jod (Bower's Asi)	12,870
Lar-tang	12,385
Rishod (Bower's Rashwa) (4·8 miles above)	13,652
Gartok (Chiang-k'a)	12,240
Guhu	11,728
Jinkanding	11,619
Gura (Dre-ch'u)	8,031
Ba (Batang)	8,223 (Gill. 8,546)

PRINCE HENRY THE NAVIGATOR.

A SPECIAL meeting of the Society was held on March 5, at the University of London, to commemorate the Fifth Centenary of the birth of Prince Henry the Navigator, the father of modern discovery and modern geography. The President, Mr. Clements R. Markham, C.B., F.R.S., occupied the chair, and there was a very large attendance of Fellows of the Society. Among those present were the Duke of York, the Portuguese Minister, Lord Amherst of Hackney, Admiral Sir Anthony Hoskins, Admiral Sir Arthur Cochrane, Admiral Sir F. Richards, Admiral Lord Walter Kerr, Right Hon. Sir George F. Bowen, the Right Hon. Hugh Childers, Lord George Hamilton, General Sir Francis de Winton, General Sir F. J. Goldsmid, Sir Eyre M. Shaw, Sir John Kirk, General W. H. Goodenough, Sir Clement Hill, Sir Henry Howorth, Sir G. Taubman Goldie, General Sir Thomas Gordon, the Hon. G. N. Curzon, Mr. F. C. Selous, Captain V. L. Cameron, and the Warden of Merton.

The PRESIDENT, in opening the proceedings, said: We are assembled this evening to commemorate the fifth centenary of the birth of that illustrious Prince to whom geographers and navigators will ever look as the founder and the creator of their science in modern times. We venerate his memory when we reflect upon the ability, the valour, and the indomitable perseverance and energy which he brought to bear upon work that is so dear to us; and that veneration is enhanced when we know that he combined with those high qualities a piety and a purity of life which have only been recorded elsewhere of a Marcus Aurelius, an Alfred, and a St. Louis. Before dwelling very briefly on

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1894.

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THE HAKLUYT SOCIETY is established for the purpose of printing rare or unpublished voyages and travels. It aims at opening by this means an easier access to the sources of a branch of knowledge which yields to none in importance, and is superior to most in agreeable variety. The narratives of travellers and navigators make us acquainted with the earth, its inhabitants and productions. They exhibit the growth of intercourse among mankind, with its effects on civilisation, and, while instructing, they at the same time awaken attention by recounting the toils and adventures of those who first explored unknown and distant regions.

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The Society has already issued all that has been written by Columbus himself concerning his discoveries: and all writings bearing on the voyages of Cabot and Cortereal, as well as the record of Galvano, and Pigafetta's narrative of the voyage of Magellan; also the voyages of Drake and Hawkins, and the discovery of the Canaries by Bethencourt.

The Arctic regions, during the sixteenth and seventeenth centuries and earlier, are illustrated by the voyages of the Zeni, of Barents, Frobisher, Davis, Baffin, Hudson, Fox, and James.

The voyages and travels to India and the Eastern Islands include Vasco da Gama, Alboquerque, Linschoten, Middleton, Lancaster, and other early voyages of the East India Company, and the travels of Friar Jordanus, Conti, Pietro della Valle, Barbosa, and others; besides the voyage of Pyrard to the Maldives, of De Morga to the Philippines, and Leguat to Madagascar, and Mr. Major's volume on early indications of Australia.

Central Asia and Persia are illustrated by Sir Henry Yule's great work, entitled *Cathay and the Way Thither*, as well as by the Embassy of Clavijo to the Court of Timor, and the narratives of Barbaro and Contarini. Mr. Badger's history of Oman and the travels of Varthema represent Arabia. Schiltberger, and Mr. Bent's volume of narratives of Covel and Dallam, relate to Turkey and the Levant Company. For early accounts of Russia there are the narratives of Herberstein, of Fletcher and Horsey, and of Anthony Jenkinson; while there are two volumes on intercourse with Japan in the seventeenth century, and Mendoza's China.

The Divers Voyages of Hakluyt open the list of volumes relating to the American continent, which includes Strachey's Virginia, Butler's Bermudas, Hakluyt's Florida, Benzoni, two works on the Amazons, Raleigh's Guiana, La Plata of Schmidt and Cabeza de Vaca, the captivity of Hans Staden in Brazil, the 5th letter of Hernan Cortes, and seven Spanish chronicles on the conquest of Peru and the civilisation of the Incas.

For Africa the Embassy of Alvarez to Abyssinia is as yet the only volume issued; but another most important work, the narrative of Leo Africanus, is in course of preparation by Dr. Robert Brown.

All the volumes have Introductions, and are carefully annotated by the best editors that could be found for the particular subject.

A great number of almost equally important voyages and travels remain to be edited; and it is very desirable that the number of members should be materially increased.

No public library ought to be without a set of the Hakluyt Society's volumes; and they should be on the book shelves of every geographer. The members are gainers individually by the prosperity of the Society, and the consequent vigour of its operations.

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A more detailed Prospectus, with a list of works already issued, and of those undertaken by editors, will be sent on application.

the personality and the lifework of Prince Henry the Navigator, I must refer in a few words to the authorities whence we derive our knowledge of him. In this respect we have, at this fifth centenary of his birth, great advantage over our fathers. They only knew the Prince from scattered notices in the great work of Barros and the narrative of Cadamosto. But in 1837 there was discovered in the Library at Paris the manuscript of the chronicle of Gomes de Azurara, a chronicle of the discovery of Guinea under the instructions of Prince Henry, written by order of his nephew, Alfonso V. It was compiled from the rough narrative of one of the Prince's sailors, and gives us many precious details unknown before. Since then we have had the Portuguese biography of the "Candido Lusitano" (1758); Germany has been furnished with the commencement of a biography by Professor Wappaeus, of Gottingen; and in 1868 appeared the admirable 'Life of Prince Henry the Navigator' by my late friend and colleague, Mr. Major, who was for sixteen years one of the secretaries of this Society. It was the chief work of Mr. Major's life, and I cannot help expressing my regret that he did not survive to witness a celebration which would have rejoiced his heart. We lament also the loss of those Portuguese noblemen who assisted and cheered him in his work—the Count of Lavradio, lineal descendant of the first Viceroy of India, the Marquis Sa de Bandeira, and the learned Vicomte de Santarem.

Prince Henry was born on March 4, 1394, at Oporto; but in this country we are obliged to keep his birthday on the following day, because the 4th fell on a Sunday. In Oporto the celebration commenced on Sunday, and will be continued for some days. The Prince's father was that famous King John I. who saved his country in the battle of Aljubarrota (August 31, 1385), and who proved to be as great as a statesman and an administrator as he was valorous as a warrior. We are happy to think that 500 Englishmen came to swell the numbers of his army, as Froissart tells us; that he formed a close alliance with England; and that he married an English Princess. The mother of Prince Henry was Philippa, the daughter of John of Gaunt, and she had cousins in England among the Beaumonts, Audleys, Cliffords, Beauchamps, Stapletons, and other families. Moreover, our sister society at Edinburgh may also boast that Queen Philippa's great-grandmother was a Scotchwoman, a Comyn of Buchan, as may be seen recorded on the beautiful tomb of her grandson, Charles the Bold of Burgundy, at Bruges. Prince Henry was most fortunate in his parents and in his brothers. The eldest of them, King Edward, wrote a little book called 'The Loyal Councillor,' which gives a simple, dignified, and lovable picture of home affections among the members of that Royal and illustrious family. When King John organized his expedition against Ceuta in 1415, his three eldest sons were old enough to

accompany him and win their spurs. Their English mother prepared three swords for them, with which they were to be girt when they had earned their knighthoods. But she was seized with a mortal illness just before the expedition sailed. Almost her last words were that it was a fair wind, and that they would sail on the feast of St. James. Her husband took care that this should be a correct forecast. Prince Henry won his spurs by his gallantry at the taking of Ceuta; and a few years afterwards his mind became full of the great work of his life—the improvement of navigation and the discovery of the unknown coasts of Africa whereby the sea route to India might be found. For this patriotic object he gave up all pleasure, all the agreeable allurements of his position, and fixed his permanent residence as near as possible to his work. He selected the small peninsula a league south-east of Cape St. Vincent—the *Sacrum Promontorium*, so called from the circular druidical temple where the old Iberians believed that the gods assembled at night. Hence the name Sagres for the adjacent headland, where the rocky surface showed no sign of vegetation save a few junipers to relieve the sadness of the shifting sand. Landwards the north-west winds were almost unceasing; while three-quarters of the horizon was occupied by the mighty and mysterious waters of the as yet unmeasured Atlantic.

"If," as Mr. Major says, "from the pinnacle of our present knowledge we mark on the world of waters those bright tracks which have led to the discovery of mighty continents, we shall find them all lead us back to that same inhospitable point of Sagres, and to the motive which gave to it a Royal inhabitant. To find the sea path to the treasures of Arabia and of India, till then only known through faint echoes of almost forgotten tradition, was one of the main objects to which Prince Henry devoted his life. The goal which he thus set before himself was at an unknown distance, and had to be attained ,through dangers supposed to be insurmountable, and by means so inadequate as to demand a proportionate excess of courage, study, and perseverance. The scientific and practical appliances which were to render possible the discovery of half a world had yet to be developed. But with such objects in view Prince Henry collected the information supplied by ancient geography, unweariedly devoted himself to the study of mathematics, navigation, and cartography, and freely invited, with princely liberality of reward, the co-operation of the boldest and most skilful navigators of every country." He also established an observatory and a school of navigation at Sagres, the latter under Messer Jacome of Majorca. The plane chart and the compass were already known; but I am inclined to ascribe the first use of astronomical instruments at sea to the sailors of Prince Henry. Diogo Gomez mentions his use of a quadrant, not, of course, an instrument anything like Davis's or Hadley's quadrant, but a much more primitive instrument. Through the kindness of the Warden of Merton we have

here to-night three very interesting instruments belonging to that college. One of them is an astrolabe of the fourteenth century: so that we are able to examine just such an instrument as was in use in Prince Henry's time. We are also able to show to the meeting a plan of the Sagres promontory, taken from the drawing in Mr. Major's book, which was obtained for him by the Marquis Sa de Bandeira. The ancient buildings, the "Villa do Infante" of the Prince's time, were, I believe, destroyed by the earthquake in 1742, but the site of the observatory is shown; and the monument to the Prince was erected in 1840 on the inner wall of the fort.

Prince Henry was made, by his father, Governor of Algarve in 1419, and Grand Master of the Order of Christ, which, as direct successor of the Order of the Templars, is the most ancient order in Christendom. It was through his command of the great wealth of this order that he was enabled to send out expedition after expedition of discovery; so that the cross of the Order of Christ must always have a special interest for geographers. For it was constantly worn by Prince Henry, by Vasco da Gama, and by other great Portuguese explorers. In 1442 Prince Henry was created a Knight of the Garter. He was the 153rd knight of that order, and the late Count de Lavardio traced down the collar worn by Prince Henry, through the intermediate possessors, to the late Earl of Clarendon. Among the public uses of these ancient orders of knighthood may, I think, be enumerated the interesting links that they thus form with past history. Surely it is a notable fact that our own princely navigator, His Royal Highness the Duke of York, who has honoured us with his presence this evening, is wearing insignia of the same order as was worn by his illustrious relative, and is enrolled in the very same knightly brotherhood and companionship that included the great name of Prince Henry of Portugal.

When Prince Henry died, at Sagres, on November 13, 1460, he had been working steadfastly and unswervingly at his glorious task for upwards of 40 years. His motto was "Talant de bien faire" ("the desire to do well"), and he had done his work so well, so thoroughly, and with such rare ability, that nothing fell out of gear when he died. The course of discovery remained unbroken. He had instilled his own spirit into the Portuguese nation, and the lofty height of glory to which that nation soared during the succeeding century was due to their spotless Prince. This, as it seems to me, is his highest praise. He not only turned the whole current of thought, in his age, to discovery, but his genius made discovery and exploration continuous, so that it has continued to progress in an unbroken stream from his day to our own. The lonely promontory of Sagres is truly the starting-point of our science.

The Prince is described by Azurara as large of frame and brawny, stout and strong of limb. His naturally fair complexion had become dark through constant toil and exposure. A miniature was found in

the manuscript of Azurara which is assumed to be authentic and to be the only true portrait. From the mourning headdress and cropped hair, compared with the date of the chronicle, it is supposed to have been painted soon after the death of his unfortunate brother, Dom Pedro, in 1449. But the statue over the centre column of the side gate to the church of Belem, at Lisbon, is, I think, more like Azurara's description of the Prince. It was erected by his grand-nephew, King Manoel "the fortunate," in his great-uncle's memory, because Prince Henry built the little chapel of Restello, for the use of sailors, on the site on which now stands King Manoel's church of Belem. The body of Prince Henry rests in the founder's chapel of the magnificent cathedral of Batalha. In the centre of the chapel are the tombs of his father and mother, John I. and his English Queen. The eldest brother, King Edward, rests under the high altar. The tombs of the other four are in a line—Pedro, Henrique, Joao, and Fernando "the constant Prince." On the tomb of Prince Henry there is a recumbent statue, with the head protected by a richly carved canopy. Three shields on the side are those of the cross of the Order of Christ, of the cross of the Order of the Garter, and the arms of Portugal. When I made my pilgrimage to Batalha, on October 30, 1889, I thought the face remarkably like that of the statue at Belem, except that it is beardless. One of the chief glories of Batalha is the magnificent cloisters, and altogether there are few grander Royal mausoleums than that in which the body of Prince Henry has its last resting-place.

Azurara tells us that the great Prince was stout of heart and keen in intellect. He was extraordinarily ambitious of achieving great deeds. Neither luxury nor avarice ever found a home with him, but he was lavishly generous. His self-discipline was unsurpassed; all his days were spent in hard work, so that by dint of unflagging industry he conquered what seemed to be impossibilities to other men. His wisdom and thoughtfulness, excellent memory, calm bearing, and courteous language, gave great dignity to his address. "Assuredly," exclaims the old chronicler, "I know not where to look for a Prince that shall bear comparison with him." "If it be the glory of England," says Mr. Major, "that, owing to her maritime explorations, the sun never sets on her dominions, it may be permitted to Englishmen to recall with satisfaction that who opened the way to that glory was the son of an English princess." His father was the greatest King that ever sat on the throne of Portugal. He was himself a most loyal and most patriotic Portuguese; and all here unite, I am quite sure, in the desire to express their sympathy with his faithful Majesty and with the Portuguese nation in their commemoration of the life-work of their most illustrious countryman.

The President, by permission of the Duke of York, read the following

telegrams: "His Royal Highness the Duke of York to his Faithful Majesty the King of Portugal.—I am present at a meeting of the Royal Geographical Society to commemorate the fifth centenary of the birth of Prince Henry the Navigator, whence myself and the society send cordial and sympathetic greetings to your Majesty and the Portuguese nation." The following was the reply: "To His Royal Highness the Duke of York.—I beg you to accept my best thanks, and please transmit to the Royal Geographical Society how pleased I am to see such an important manifestation made to the Portuguese hero that opened Africa and India to the modern world. In the name of Portugal accept, all of you, our sincere thanks.—The King of Portugal." *

Sir GEORGE TAUBMAN GOLDIE, Vice-Governor of the Royal Niger Company: I have been asked to-night to give a short description of the African regions discovered by Prince Henry. Our President has given a most able address, I am sure we shall all agree, covering the general career of Prince Henry, and I understand that we have here to-night two gentlemen who have made a special study of the subject, and who will, no doubt, give us many interesting details of the expeditions sent out by that Prince. I propose, therefore, not to deal directly with Prince Henry's work, because to do so would be to weary you with repetitions, but there is one feature of his character to which I must refer, because it is intimately allied with the subject allotted me this evening. It is that Prince Henry was content to work, not for his own generation, but for posterity. It was only with the eye of faith that he could see the extraordinary greatness to which the small country of Portugal rose during the 120 years after his death. To-day there are five or six European nations all engaged in working for posterity in the equatorial regions of the same great continent of Africa to which Prince Henry devoted his attentions, regions which cannot be expected in a single generation to yield those brilliant material results which alone command popular admiration. As you know, from time immemorial the inhabitants of these regions have lived under conditions of insecurity to property and liberty and life, absolutely incompatible with the growth of industry or the accumulation of capital. I have never wavered in my belief that the introduction of better political social conditions will gradually make equatorial Africa wealthy as well as free; but the workers of our time—and I have no doubt there are many of them here to-night—must be content, like Prince Henry the Navigator, to look at a promised land into which they themselves will never enter, and in which, with

* The following telegram was also received from the President of the Lisbon Geographical Society:—

"The Council of the Geographical Society of Lisbon congratulate themselves with the Royal Geographical Society for its significative commemoration of the fifth centenary of the immortal Infante Don Henrique."

perhaps one or two exceptions, like the King of the Belgians and H. M. Stanley, their very names will be forgotten.

The unknown Africa of Prince Henry's time may be taken as commencing with Cape Juby, opposite the Canary Islands, the regions to the north lying within the Mediterranean State of Morocco, which two thousand years ago was a province of Rome. The southernmost point reached by Prince Henry's emissaries was Cape Mesurado, in Liberia. In taking this limit, I am assuming as one of his expeditions that which actually left Portugal (after his death) in 1461, but there is no doubt that Prince Henry planned it and probably organized it. The distance between Cape Juby and Cape Mesurado, following the coast, is about 1800 miles, and my difficulty is how, in the course of five minutes, I am to give you an adequate description of that immense region without laying myself open to the charge of inaccuracy. I am rather cautious on this point, as I have just had a lesson. About a fortnight ago I was asked about the wandering tribes of the Tuaregs by an interviewer, and in order to get rid of him, for the sake of brevity, I described them as the Arabs of the Central Sahara, just as people talk of the Gallegos as the Auvergnats of Spain. A few days afterwards, I saw a short leader in one of our great London journals, which not only stated the undeniable fact that the Tuaregs are not Arabs, but indulged in some gentle sarcasm either about the inaccuracy of the reporter or my ignorance, I could not quite make out which. But you will understand that, speaking very briefly, I must speak generally. That region is divided into two nearly equal but very dissimilar parts. From Cape Juby down to the Senegal river is the western limit of the Great Sahara, so I need hardly tell you it possesses what Lord Salisbury called on a notable occasion a "light soil," that it is deficient in water, healthy in climate for those who don't mind heat, and very sparsely populated. Its inhabitants are wandering and pastoral tribes, varying in colour from light brown to dark brown. In the southern half, namely, from the Senegal river to Cape Mesurado, every one of these conditions is different. Here you have again, speaking broadly, a fertile soil, a decidedly unhealthy climate—there are many here who can vouch for that—very plentiful waterways, and a population comparatively dense, and consisting of more or less pure negro races, who are sedentary and agricultural in habit. I shall not weary you with a long catalogue of the races and tribes scattered over this immense maritime region. Such a catalogue would be useless to those acquainted with the subject, and could not possibly be remembered by those who are not. But I will say a few words about the existing political divisions.

From Cape Juby to Cape Bojador is the only part of the coast of Western Africa not yet appropriated by some recognized state. Certain claims are raised to it by Morocco, and certain others by Spain, while at Cape Juby itself there has been, since 1880, an important British

station, which has not been recognized as a British possession, but of which I hope our countrymen will not lose sight. From Cape Bojador to Cape Blanco, nearly 500 miles, is held by Spain, which also claims about the same distance into the interior; but I have noticed in the Paris papers, since the taking of Timbuctoo, an inclination to draw a line from Cape Blanco at a sharp angle with the coast, cutting Spain off with a very small section indeed.

At Cape Blanco begins the great West African possession of France known under the different names, for administrative purposes, of Sénégal, Sudan Français, and Rivières du Sud, which form, however, one great possession, of which the French are very naturally proud, and on which they are spending a great deal of money. It extends inland 900 miles from the Atlantic as far as Timbuctoo. With the exception of two very interesting small wedges belonging to other nations, France extends on the seaboard right down to the frontier of Sierra Leone. This British possession has a coast-line of about 200 miles, and extends about the same distance into the interior, but can go no further. I may remind you that about fourteen years ago France, then firmly established on the Senegal, commenced a policy of what is called *lateral expansion*, and has gradually cut off the coast colonies of England and Portugal from the interior. As this is a Geographical Society, and not a Colonial meeting, I merely state facts without any comment. I mentioned two small wedges in the French coast-line. The northernmost is the British possession on the Gambia, which is of special interest to us at present, on account of the late disaster there. I dare say we shall hear something to-night, from those going to tell us of Prince Henry's work, of the interesting fact that the first expedition that discovered the Gambia, was almost annihilated by coming in conflict with the natives. One cannot help thinking of the enormous stride made, during the last three or four centuries, by the public conscience of Europe. In those days, our conflicts with the natives generally arose from our trying to capture them as slaves. To-day our conflicts in Africa are due to our trying to prevent the capture of the natives as slaves by marauding chiefs like Fodi Silah, or their extermination by savage potentates like Lobengula. Not far south of British Gambia comes the small Portuguese colony of Guinea on the Rio Grande. This is doubly interesting to us to-night—firstly, because this was the last discovery of which Prince Henry heard before his death, in 1460; and, secondly, because, although Portugal still holds great African possessions south of the equator, this little territory of Guinea is all that remains north of the equator of the vast regions gained for her by Prince Henry and his successors. It is not for me to dwell on the causes of this decline before this audience—the disastrous union with Spain in 1580, and the "sixty years' captivity" which gradually destroyed the spirit of Portuguese enterprise created by Prince Henry—but I may perhaps venture to say

this, that although the power of Portugal has waned in that north-western region as in the far East, nothing can rob her of the glory of having led the van of modern exploration, a work without which, I venture to say, Columbus would not have discovered America, while Prince Henry the Navigator, whose genius and patient industry conceived and organized this great work, has built himself an everlasting name.

Captain W. J. L. Wharton, Hydrographer to the Admiralty: It is very difficult for a modern sailor to put himself in the position of the sailors of the time of Prince Henry. I do not know how far it is possible for a modern landsman to do so, but probably he does not appreciate the difficulties quite so much as we do; and as this is an important point in the life and work of Prince Henry, I wish to endeavour to put before you the different conditions. In these days mathematicians and astronomers have observed the positions of the different heavenly bodies, calculated their orbits, and given us tables showing the position of these bodies for every second in the year. We have perfect instruments made for us by mathematicians and mechanicians with which we can observe these heavenly bodies. The watchmaker makes us perfect, or almost perfect, watches that take about our time, or, in other words, our longitude. We have almost perfect compasses that enable us to steer in any direction we wish, and also we know the varying changes, or the variation of the compass in different parts of the world. We have also the result of the labours of many marine surveyors who have mapped nearly the whole world for us. Charts are not quite so perfect as some people believe, but they are quite sufficient to enable any navigator to direct his course from one point to another with unerring certainty, and to know of anything that he is to meet in his way. We have also the more mundane but very necessary point of our provisions, which are well preserved for us, and we have no fear of scurvy. In fact, navigation in the present day has become so easy, that a feeling is growing up that any fool can navigate, and as a consequence a certain number of ships are lost every year that need not be lost. One of the conditions of Prince Henry's time was that absolutely nothing was known of navigation.

Certainly the Chinese and Arabs had navigated and studied astronomy to such an extent that they were able to make long voyages in their part of the world and know where they had got to, but Europe had fallen into a state generally called the Dark Ages, when Prince Henry rose and determined to form a school of navigation, and to press forward navigation in the unknown Atlantic, of which we must remember nothing was known south of Cape Bojador. Sailors had a most primitive quadrant, and any one can picture their endeavours to point this instrument to a star with a ship rolling about on all sides. One ceases to wonder that very often they did not know where they had been, and unfortunately they had no nautical almanac. It is not astonishing that, when sailing out of the Mediterranean, the sailor hardly ventured out of sight

of land. Prince Henry worked for several years exploring the unknown west coast of Africa, and for some years they did not get beyond Cape Bojador; why, I have never been able to understand. I have seen it stated, in lives of Prince Henry and elsewhere, that there is a long reef stretching out so far that the navigators were afraid to go round it. Our modern knowledge tells us there is nothing of the sort, that Bojador is perfectly clean, and I hope some one will be able to tell us why it proved such a sticking-point to the Portuguese navigators of that day. They, however, kept working down until the time of Vasco de Gama, who crossed to India; but the charts they left behind for their successors, as far as we are able to judge now, were very imperfect guides indeed. Prince Henry caused a large map of the world to be made by an Italian who had great distinction, Fra Mauro, but as for being a guide for a sailor, I should be sorry to find my way by it. It starts by assuming that the world is confined by a circle, therefore there is nothing like a compass bearing. At this time the utmost that was known was down to the Bight of Benin. Fra Mauro's map shows the Senegal as twin rivers. All the eastern part of the map was taken from the Arabian geographers. It was this state of things that Prince Henry set himself to put right. He established a school of navigation, set people to work at astronomy, encouraged the pushing of voyages south until they went round the Cape. As has been said, he was the originator of modern exploration, and a leader of discovery in the unknown world. This is a great claim to the remembrance of posterity, and Englishmen will always be proud to remember that he was half an Englishman.

Mr. Raymond Beazley: I venture to think that the life of Prince Henry the Navigator is best considered as an incident in the great movement of European expansion which produced such widespread effects a little later, as the turning-point between the periods of mediæval and modern exploration. It is through this onward movement which the Prince of Portugal began that we know, to some extent at least, the whole of the surface of the globe, instead of the one-twentieth or one-fiftieth which really composed the entire geographical outlook of the Christian Middle Ages.

In Camoens' 'Lusiad,' the National Epic of Portugal, Henry is the "generous" prince who first

> "Opened up those wastes of tide
> No generation opened before,"

and his work is essentially one of preparation and transition, gathering up the threads of the past and preparing for the results to come—the achievements of Columbus and Da Gama and Magellan. For if the Prince himself did not live to see these results, they were none the less due to the inspiration he had given and the example he had shown.

In all his work the Infant had three aims—first, the exploration of the unknown world, and especially the discovery of the sea route round

Africa to India; second, the creation of a commercial empire for his country; and, third, the conversion of the heathen.

With these objects before him, he set himself to the task of breaking down that middle wall of superstitious terror and ignorance which had so long confined Christendom within a narrow section of the Western world.

But to take a true view of Henry's position in the story of our geographical advance, we must look back at the various stages of preparation for his work, starting from that body of knowledge and theory which the science of the Græco-Roman Empire bequeathed to Christendom. First of all, in the ages between Constantine and Charlemagne, most of the interest shown by Europeans in discovery, or travel of any sort, took the shape of pilgrimage; then the northern movement of the Vikings or Scandinavian pirates and sea rovers woke the duller nations of the West into a new activity, and produced on one side the first recorded discovery of America (Vinland); on another, the foundation of the mediæval kingdom of Russia; on a third, the extraordinary increase of Eastern pilgrimage and travel which both prepared for the Crusades, and produced the most permanent fruits of that great convulsion.

The Crusades themselves, the central era in the history of Latin Christendom and Christian exploration, resulted in a threefold extension of western geographical enterprise—in Eastern land travel, Atlantic ocean-voyaging, and scientific progress. The travels of Marco Polo and the Friar missionaries of the thirteenth and fourteenth centuries illustrate the first of these developments; the attempts of Genoese, Catalan, French, and Portuguese sailors in the Sea of Darkness, between 1291 and 1410, illustrate the second; the invention or transmission of the compass and the astrolabe, and the improvements in maps and charts through the new Italian coast surveys, or Portolani, are sufficient proof of the third.

By the movement of land travel in the Further East, it was first clearly revealed to the Christian West what might be gained from the "Thesauri Arabum et divitis Indiæ," which had been the prize of the world's trade-routes from the earliest time. By the movement of maritime enterprise in the ocean off the west of Africa, the first suggestions were given of a scheme which was ultimately successful of wresting the commercial empire of Asia out of the hands of the Moslem monopolists of the overland tracks; by the investigations in scientific geography, sailors were given the power as it were of venturing out of sight of land, and were impressed with those ideas of accurate observation upon which alone a true map of the world could be based.

The mere scientific interest would hardly have proved a lever sufficient for Henry's work; he was successful through his power of appealing to the ambition and the greed of a young and powerful nation, in whom had always been traceable a certain latent genius for seamanship.

His life may be divided into three periods: first, from his birth, in 1394, to the conquest of Ceuta, in 1415, which brought him into direct contact with Africa, and the questions of its shape, its size, its people. It was here he met the caravans of the Sahara and the merchants of the Guinea coast—his halfway house to India, which so long deluded the Portuguese with the hope of a quick approach to India. It was here that he seems to have conceived his project of circumnavigating Africa, and so of sending his ships, of war or trade or mission, direct from Lisbon to Malabar by this new ocean route.

The second stage in his life, from 1415 to 1441, was the earlier and more unsuccessful epoch in his struggle to realize this ambition. From the time that he settled at Sagres, near Cape St. Vincent, in 1418, retiring from the court and the fashionable world—an exile from the known world exploring the unknown—down to the arrival of the first gold-dust from Guinea in 1441, the Prince was, we might say, in opposition, trying to popularize an unpopular cause, fighting against a powerful and venomous resistance.

During the third and last period, from 1441 to 1460—from the time when the Infant's schemes began to promise some material profit, down to the time of his death—the murmurs of opposition and detraction were almost silent; the genius of the leader became the inheritance of his people; his work, his mission, his hopes, were adopted by the passionate enthusiasm of a nation entering upon its Heroic Age.

From the impulse given by Henry the Navigator we must derive not only the direct results, for example, of Gil Eannes, who first passed that "Finisterre" of West Africa, Cape Bojador, in 1434; of Diniz Diaz, who rounded Cape Verde in 1445; of Cadamosto and Diego Gomez, whose discoveries along the coast of Sierra Leone and among the Cape Verde islands brightened the last years of the Prince's life; of the early Portuguese settlers in Madeira, the Canaries, and the Azores, who in the Infant's lifetime made a new beginning of European colonization,—but the indirect results of the same movement must be traced back to the same source. For the voyage of Bartholomew Diaz round the Cape of Good Hope in 1486, and of Da Gama to Calicut in 1497-9, with the outcome of their efforts in the Portuguese empire in the East—the first of modern colonial dominions, and so important a turning-point, as Mr. Lecky has insisted, in the story of modern progress—were certainly no more than the realization of Prince Henry's schemes; on another side, Columbus, as we are told by his son, was first inspired with the thought of discovery in the far West by witnessing the apparently interminable progress of Portuguese exploration towards the South; lastly, the circumnavigation of the globe by Magellan (1520), the various colonial and commercial empires, of Spain, Holland, France, and England, which grew up on the ruins of the Portuguese possessions in the East, and the vital improvements in geographical knowledge and science from the

fifteenth century down to our own day, are also in more or less clear relation to the work of that

> "Lusitanian Prince, who, heaven-inspired,
> To love of useful glory roused mankind,
> And in unbounded commerce mixed the world."

For the whole onward and outward movement of our modern European civilization was set in motion by one man. It might have come to pass without him; but the fact is that, through him, it did as a matter of history result. "And let him that did more than this, go before him."

Mr. H. YULE OLDHAM: There are two vital dates in the history of the exploration of the West African coast under Prince Henry's auspices: the one is 1433, when that formidable Cape Bojador, of which mention has been made, was rounded; the other falls ten years later, in 1443, when, for the first time in the Bay of Arguin, inhabited islands were discovered. Up to this period Prince Henry had with indomitable determination, against increasing remonstrances, continued his efforts along an apparently inhospitable coast. The moment, however, that the prospect of a profitable field for commerce was displayed all was changed, the Prince was loudly praised, and keen competition for the benefits to be derived from his discoveries ensued. Even from foreign lands strangers were attracted.

About ten years after this event, there was living in Venice a young member of a noble family, Alvize da Cadamosto, who was attracted somewhat accidentally into the service of the Prince. It is of him that I am asked especially to speak. Gil Yanez, Nuño Tristam, Alvaro Fernandez, and others who did brilliant service before his time, have left little but the bare record of their names and achievements. Cadamosto, however, has left a monument more durable than brass in his written description of his voyages, which incidentally throw most valuable light on the character and methods of Prince Henry.

In the year 1454, he tells us, being twenty-two years of age, and having already made voyages in the Mediterranean and as far as Flanders, he resolved to return to that country with the determination to employ his youth in acquiring riches, experience, and, if possible, fame. He never arrived in Flanders, for a storm detained the fleet, with which he had sailed, off the Portuguese coast near Cape St. Vincent, at a time when Prince Henry was living in the neighbouring village of Riposera, where, as Cadamosto says, he had retired to find quiet for his studies. As soon as the Prince heard of their arrival, he sent his secretary and the Venetian Consul on board with samples of sugar from Madeira, dragons' blood, and other products of the lands found or colonized under his care. Wonderful stories were told of these lands and the enormous profits to be made there, even 1000 per cent., and the handsome conditions offered by the Prince were explained, namely, his readiness to furnish any one with a ship and everything save cargo,

the profits to be equally divided, and loss, if loss there were, to be wholly borne by himself. It was added that the Prince would be particularly pleased with a Venetian who would undertake a voyage, as he was convinced that spices were to be found, and knew that the Venetians understood these articles better than any other nation—a striking remark, showing apparently that the Prince's schemes reached beyond the African coast to the riches of the East. Cadamosto was attracted by these overtures, and resolved to venture his fortune in the new lands. Prince Henry was well satisfied, and, after being handsomely entertained at St. Vincent throughout the winter, our Venetian was despatched in a new and fully equipped caravel in the spring of 1455.

I cannot now describe a tithe of the interesting and wonderful things that were seen and carefully recorded on this voyage; a few must suffice.

On Porto Santo he found Bartholomew Perestrello acting as governor; this was the head of that family into which Columbus subsequently married. In this island and on Madeira he heard of some of the difficulties which Prince Henry had to contend against in his efforts at colonization, a fire lit on the latter, to clear a space in the woods, having burnt so furiously as to drive the settlers into the sea, where they remained for two days up to their necks in the water. In the Bay of Arguin he found a fort had been built by the Prince to protect his traders, who were selected and licensed. A month was spent on shore near the Senegal, in acquiring information about the customs of the natives, the commerce of the country and trade with the interior, anything new being placed on one side for the Prince, who in this way received from Cadamosto an elephant's tusk and foot, to his great satisfaction.

The voyage was then continued to the Gambia, about which Prince Henry had heard, but had no precise information. On the way a Genoese, Antoniotto Uso di Mare, was encountered, who had also, like Cadamosto, been attracted to Portugal. The Gambia was reached and for the first time explored, but not to any great extent, owing to the fierce hostility of the natives; so a return was made to Portugal.

In the following year a second voyage was made by Cadamosto, and the coast beyond the Gambia explored as far as the Rio Grande, several names being given to rivers, some of which, such as the Casamansa, are still retained.

It was in this voyage that the Cape Verde Islands were discovered, the only absolutely new discovery in this region made under Prince Henry, for the Madeiras and Azores are to be seen on maps of the preceding century, and the coast as far as Sierra Leone had been visited by the Carthaginian Hanno hundreds of years earlier. I may, however, say that, from evidence recently discovered, I have little

doubt that some of Prince Henry's explorers reached America nearly fifty years before Columbus' first voyage, but that is a matter which cannot now be entered into. I can only conclude with Cadamosto's own eulogy of the Prince—"He was the most accomplished Prince of his time, the least of whose virtues would serve to immortalize another."

The PRESIDENT: We English have now done our very best to express our admiration of this great prince of navigators, and I am sure this meeting will be pleased if his Excellency the Portuguese Minister will be so kind as to give us some idea of what his opinion has been of our endeavours.

The Portuguese Minister, SEÑHOR DE SOVERAL, rose, at the invitation of the President, and said: Your Royal Highness, my lords, ladies, and gentlemen, it is with a legitimate pride and a deep emotion that I rise to thank you all in the name of the King, my Government, and the Portuguese nation for the splendid tribute paid this evening to the great Prince Henry. Yesterday at Oporto his Most Faithful Majesty, surrounded by his august family, laid the foundation-stone of a monument to the hero, and, on the waters of the Douro, the presence of a British man-of-war added to the brilliancy of the act. We see this evening here the illustrious Prince in whose veins runs somewhat the same blood as that which ran in the veins of the great navigator, and he is also a sailor. You alluded, sir, to the Order of Christ. Every one who is conversant with the work of your lamented friend, Mr. Major, knows how great was the influence of that order on the early maritime enterprise of the Portuguese. This high distinction has been conferred upon me after the signature of the treaty between Portugal and England, which ended for ever, I hope, our serious trouble about the territorial disputes in Africa. Before I resume my seat, I have to fulfil a most grateful mission which has been entrusted to me. On my way to London I stopped in Paris, and I had the honour of being received by his Royal Highness the Prince of Wales. His Royal Highness desired me to state on this occasion how great is the interest he takes in the celebration of this memorable event, and how pleased he feels to see his son associated with it. The Prince added that he felt confident that this splendid commemoration of the great services rendered by the great navigator to the whole world will cement the old and traditional friendship so happily initiated by the marriage of King John the First and Philippa of Lancaster.

The PRESIDENT: This great meeting, assembled here this evening, makes it manifest that the memory of Prince Henry's work is not forgotten in our country, and the presence of two young students who are engaged on literary labours connected with his career is a further proof of this. Mr. Beazley is writing the Prince's life, and no one in this country has so intimate a knowledge of the voyages of Cadamosto as Mr. Yule Oldham. The Society will be much pleased at having been

honoured by the presence of His Royal Highness the Duke of York this evening; and we are gratified at the message from our Vice-Patron, His Royal Highness the Prince of Wales, delivered by his Excellency the Portuguese Minister, expressing approbation of our proceedings, and pleasure that his son is associated with them. We rejoice, also, that the proceedings to-night have been gratifying to His Excellency, and we trust they will be equally so to His Faithful Majesty and the Portuguese nation. For ourselves I trust they will serve to impress the leading facts of Prince Henry's life more firmly on our minds, and encourage us, as geographers, always to remember his motto, "Talant de bien faire."

THE EARLY CARTOGRAPHY OF JAPAN.

By GEORGE COLLINGRIDGE.

In the year 1542 Japan was accidentally discovered by Antonio de Mota, a Portuguese sailor, who, being driven out of his course, was the first European to sight its shores. A few years later St. Francis Xavier founded a mission there, to which we owe the first information that we have concerning Japan and the Japanese. As far as I have been able to ascertain, twenty-seven years elapsed after this fortuitous discovery before we find on maps any apparent result of the knowledge of the country thus acquired by Europeans.

Portolanos were made, no doubt, and in 1569 appeared Gerard Mercator's invaluable map of the world. On this map an island is set down in the locality of the southern half of Japan, with the legend "IAPAN *dicta Zipangri a MPaulo Veneto, olim Chrise.*" * The configurations of this island, when compared with a modern map of Japan, will be seen to include the south-western peninsula of Niphon and the two southern islands, Kiusiu and Sikok. What is called the "Inland Sea," between the inland shores of the above-named islands, appears therefore to have been unknown to Mercator, who makes one island of the three.

Mercator's charting of Japan is probably the first ever made on a world map by European cartographers; for, as I hope to be able to show, the "Zipangri" referred to in Mercator's inscription, Marco Polo's Zipangu, Toscanelli's and Christopher Columbus' Cipango, have nothing to do whatsoever with Japan.

The name "Cipango" has been written in many different ways, and its similitude to Japan, Ji-pen-koué, Ge-pen, Jih-pun, etc., has been commented upon at great length by able authors, who, however, would have

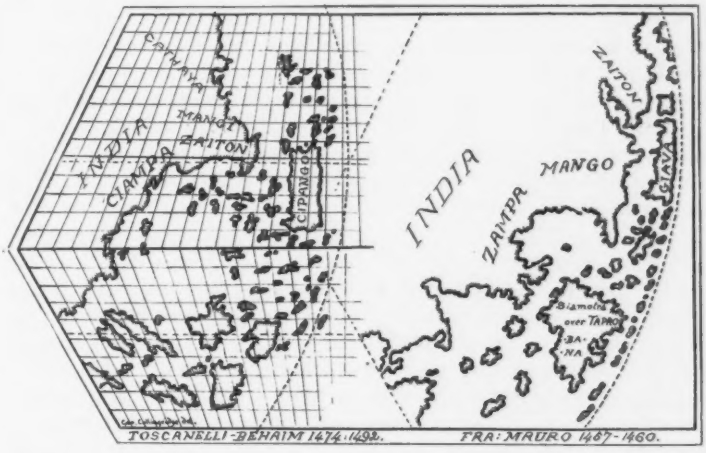
* I am quoting from Jomard's copy. Nordenskiöld says (Nordenskiöld's Facsimile Atlas, pages 96, 132, 2nd col.), "It is reproduced in full size, but without some of the important legends."

been wiser had they inquired first on what foundation they were building. When a close inquiry is made into the subject, the only apparent reason for believing that Cipango was Japan consists in the fact that when that island was discovered, another island of the name of Cipango was found to occupy, *on maps*, its approximate position, and that Marco Polo had said that "Zipangu" was an island in the Eastern Ocean. Now, if the Eastern Ocean of Marco Polo can be shown to be the Java Sea, and Cipango to be an island of the Eastern Archipelago, the whole fabric of Ji-pen-Koué construction will fall to the ground. The method I followed to ascertain the truth in this matter is simple enough. I searched on old maps for the origin of the charting of Cipango, and I read up Marco Polo's descriptions carefully.

There has always been a wonderful amount of conservatism with geographers; fortunately, they are not prone to invent when they can possibly avoid it. Toscanelli and Martin Behaïm were the first geographers of the Renascence to place Cipango on the spherical representation of the earth; but they copied, I was going to say traced, their Cipango from Fra Mauro's map. Fra Mauro's celebrated Mappamundi, itself based on older maps the origin of which can be traced to the very dawn of geography, was the most important and complete document that Toscanelli and Behaïm could have recourse to for information, and although it belonged to a type of maps then on the eve of reformation, its configurations, apparently, were not to be despised. The Toscanelli map in which Cipango appears is now lost, but it was described so minutely by Toscanelli in his letter to the court of Portugal in 1474, and also in the letter he sent afterwards to Columbus, that we know it to be similar to Behaïm's unique globe of 1492. Behaïm's Cipango (Cipanga in Jomard's copy) is, as I have said, almost a tracing of Fra Mauro's large island similarly situated in the Eastern Ocean; but Fra Mauro's island bears the name of *Giava*. It is, in fact, Java, and not Japan, as a comparison of the two will show at once. This changing of Fra Mauro's Giava into Cipango prevented the identification of Java, and caused the mistake to be ignored to this day. Toscanelli then proceded, in order to make use of the name stolen from the proper Java, to apply it to a large island south of the equator. It would be difficult to find out the exact reason that urged Toscanelli to convert Fra Mauro's Giava into Cipango; several reasons may be suggested, to which I shall refer by-and-by.

Those islands of the East Indian Archipelago, Java, Bali, Lomboc, and Sumbawa, as represented on Fra Mauro's Mappamundi, must have been drawn from a portolano, for they bear, especially Java, the characteristic correct features of those documents; but Toscanelli, totally ignorant, no doubt, if the true form of Java, took no heed of its correct features as represented on Fra Mauro's map, He apparently ignored, also, the circumstances that compelled Fra Mauro to place his Giava and

other islands south and north, instead of west and east as they should be; otherwise, when he stretched out the world on its spherical projection, having more room for those islands, he would have placed Java and its eastern prolongation of islands in their true west and east position, south of the equator, had he known them to be truly represented as to form and topographical contiguity. One of his reasons, therefore, for changing the name of Giava to Cipango must have been derived from the importance he attached to Marco Polo's descriptions. The importance that the Venetian traveller himself gave in those descriptions to Cipango must also have caused him to increase the dimensions of that island. Another reason was no doubt suggested to Toscanelli by the easterly position occupied by Fra Mauro's Giava, which answered to



Marco Polo's Eastern Ocean. He evidently thought that that island had been misnamed, and, in consequence, he transferred Fra Mauro's nomenclature to the south of the line, giving it to the large island bearing the name *Siamotra over Taprobana* and TAPROBANA in large capitals.

We must now see what Marco Polo's evidence is in the matter; but before doing so, it may be well to offer some explanation for Fra Mauro's strange mistake in placing Java north of the equator, and in the approximate latitude of Japan. The circumstances that compelled him, as I have said, were of a twofold character—tradition and want of space. Before the construction of globes and the revival of graduated maps, all maps of the world of any importance were represented within a circle formed by the circumfluent ocean. In maps of the world of this description, Java and other islands of the Eastern Archipelago are represented in the Eastern Ocean. The following are some of the maps:

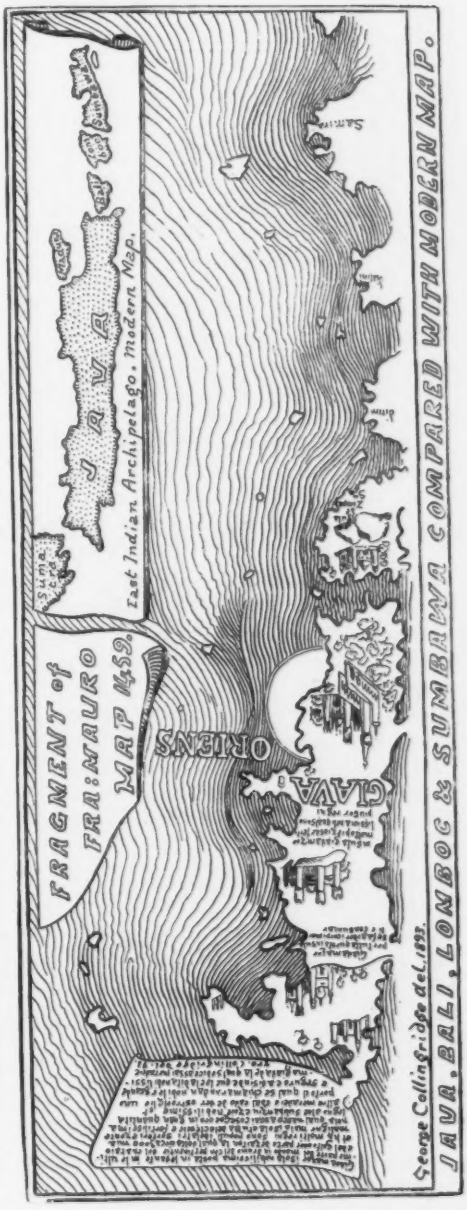
The St. Sever Mappemonde, of the eleventh century; a map of the twelfth century, from a manuscript in the library of Turin; Marino Sanudo's map of the world, from the beginning of the fourteenth century; Andre Bianco's map of the world of 1436, etc. Precedent, therefore, commanded Fra Mauro to place Java and other islands in the East. Owing to the peculiar shape of his map, and the absence of graduation, he was compelled to place the Indian Archipelago south and north, instead of west and east; furthermore, having no graduation to guide him, he did perceive that he placed those islands north of the equator; nor is it certain that the equator, or the position of the East Indian Archipelago with respect to it, troubled him much, although he put on record a protest against the want of space. This protest his followers availed themselves of, but not in the right direction. The want of space was noticed by Fra Mauro precisely in the Eastern Ocean, for he says, *In questo mar oriental sono molte isole grande e famose che non ho posto per non aver luogo.* The large and famous islands that he did not set down for want of space were, no doubt, Borneo, Celebes, and the Philippine group.

Marco Polo, writing from hearsay, describes, in my opinion, Java, and perhaps other islands contiguous to Java, under the name of Zipangu. The other islands may have comprised the whole group of the East Indian Archipelago as far as Sumbawa, Zipangu being the early form of Sumbawa. Zipangu, to use a common expression, was the peg on which hung the tale of a kind of reflex-Java, for Marco Polo describes the real Java in another part of his book. Zipangu is described in the second, third, and fourth chapters of his Third Book. In the second chapter Marco Polo says that the island of Zipangu is in the Eastern Ocean, at the distance of about 1500 miles from China. As he gives precisely the same distance to Java, it will be noticed that there may be some confusion here, and that the distance refers to the East Indian Archipelago; for Japan is much nearer to the coast of China, the distance being 500 miles, whereas 100 miles barely separate Japan from the continent at Korea.

The next item of importance is the description of the "extraordinary richness of the sovereign's palace," and the general wealth of the island in gold, silver, and precious stones. These descriptions may be considered as partly fabulous, but, however, have always referred to Java. Ptolemy's Jabadioe, or Sabadibe, identical with the Sanscrit Jawa Dwipa, which is now known beyond doubt to refer to Java, is, both in Ptolemy's descriptions and in the Hindu poem Râmâjana, described as abounding in gold and silver. Odoric of Pordenone gives a description of the king's palace in Java, almost in Polo's words, when speaking of Cipango. Marco Polo then describes various customs, and gives a graphic account of a military expedition sent against Cipango by the great Khan Kublaï.

All the customs referred to are applicable to Java, especially the burning of the dead, practised to this day. The great Khan Kublaï

may have sent military expeditions to Japan. We know for certain that he sent several to Java, and the one described by Marco Polo bears many signs of having been sent to Java or some island of the Eastern Archipelago. The date coincides approximately with one of the expeditions sent to Java. But a stronger reason for believing that it was sent against the Javanese is given by the reference made to "the efficacy of a diabolical charm, consisting of a jewel or amulet introduced into the right arm between the skin and the flesh," and according to which combatants "were rendered secure from the effects of iron, either to kill or wound." We have here an essentially Javanese belief, which is common also to several islands of the Eastern Archipelago. Nicolo de' Conti describes it thus: * "Et nell' isola maggior di Giaua dice hauer inteso che vi nasce vn' arbore, ma di rado, in mezzo del quale si trova vna verga di ferro motto sottile,



* Ramusio, 'Delle Navigationi et Viaggi,' fol. 344 F., date 1563.

et di lungezza quanto é il tronco dell' arbore, vn pezzo del qual ferro é di tanta virtù, che chi lo porta adosso che gli tocchi la carne, non può esser ferito d' altro ferro, & per questo molti di loro s'aprono la carne, & se lo cuciano tra pelle & pelle, & ne fanno grande stima." "The island of Java, called *Major*, produces a tree of great rarity, in the middle of which there is found an iron rod, very thin, and as long as the trunk of a tree. He who carries about him a small piece of this iron rod, so that it may touch his flesh, is invulnerable by iron, and for this reason many persons open their skin and insert it in their bodies. This is esteemed of the highest importance by them." *

The third chapter bears the title "Of the Nature of the Idols worshipped in Zipangu, and of the People being addicted to Eating Human Flesh." It is hardly necessary to refer here to the Hindu figures representing deities, or idols, as they were called. The ruins of Singha Sari and other antiquities of Java, with their Hindu mythological figures, have been well described by some few authors. In Raffles' 'Java,' all the figures erroneously attributed to Japan may be seen, from the Brahman bull, the human figures with elephants' and other animals' heads, to the figures of Hindoo deities, each double-headed, three-headed, or four-headed, and with several pairs of arms.

It was, no doubt, to the worship of these idols that the inhumanity, supposed or otherwise, of the people of Java was attributed. Nicolò de' Conti ('India in the Fifteenth Century,' p. 16), describing the inhabitants of Java, says, "The inhabitants of these islands are more inhuman and cruel than any other nation. . . . They exceed every other people in cruelty . . ." Zudovico Barthema, writing about sixty years later in 1503, is less sparing in his appreciation of the Javanese. He consecrates chapter xxviii. of his book of travels to "theyr cruell maners in selling their parentes to the Anthropophagi to be eaten." †

In the fourth chapter Marco Polo describes the "Sea of Chin," between Zipangu and China. This chapter is conclusive; it is impossible to make out that it treats of any other locality except Java and its eastern prolongation of islands. In all contemporaneous writings and maps the "Sea of Chin," or Chinese Sea, extends from Java and the Spice Islands to the shores of China. This is the sea in which the Chinese junks performed, and perform to this day, their annual navigations, sailing along the coasts of Anam, and thence to Singapore, Sumatra, and Java, etc., and returning with their freights when the favourable monsoon set in. It is curious that Marsden, in his edition of Marco Polo, did not notice what discrepancy there was in assuming Cipango to be Japan, when in his own words, commenting on the homeward-bound voyages of the Chinese junks, he says, "Such also at the present day is the

* The travels of Nicolò Conti, in 'India in the Fifteenth Century,' edited by R. H. Major, for the Hakluyt Society, p. 32, anno 1857.

† 'Voyages of Vertomannus,' A.D. 1503 (Richard Eden), p. 232. Aungervyle Society's edit., 1884.

state of navigation amongst the Chinese, whose junks are employed in trading to Java (*sic*) and other islands of the Archipelago, but, not being adapted either by their construction or mood of rigging to work against a contrary wind, require two monsoons for the performance of their outward and homeward-bound voyages. The account here given of these periodical winds is substantially correct. In the China seas the north-east or winter monsoon, being that which is favourable for sailing from the southern ports of China to the Straits of Malacca or Java, commences about the month of October or November, and lasts till about February or March; the south-west monsoon sets in about April or May, and blows till August or September, during which latter season the junks return homewards."

In conclusion, one small item requires elucidation; the name "Cipango" does not appear to bear much resemblance to Sumbawa. But both names, the one derived from the literature of Marco Polo, and the other derived from the cartography of Sumbawa, have at least a dozen different orthographies, and Cipango and Sumbawa are perhaps the most opposite. If we make a more homogeneous choice, we shall find Zimpagua instead of Cipango, and Zimpagu instead of Sumbawa, the latter name being the one given to Bali in close proximity to Java in Fra Mauro's Mappamundi.

BARON TOLL'S EXPEDITION TO ARCTIC SIBERIA AND THE NEW SIBERIA ISLANDS.

At the meeting, January 24, of the St. Petersburg Academy of Sciences, Baron Toll read a report on his interesting expedition.

In 1889 the Academy had received from a merchant, M. Sannikoff, information to the effect that the body of a mammoth had been discovered under the 73rd degree of latitude, on the Balakhna river, which flows into Khatanga Bay; and it at once invited Baron Toll to take the leadership of an expedition for the investigation of the discovery. The bad state of Baron Toll's health compelled him, however, to decline the offer, and M. Chersky was sent out to make collections of post-tertiary mammals in the far north-east, on the rivers Yana, Indighirka, and Kolyma. After Chersky's untimely death, the proposal to start for the Khatanga was renewed to Baron Toll, and it was decided that he would not only examine the mammoth find—which, after all, might prove to be of no importance—but also make a general exploration of the very little known Anabar region. He left St. Petersburg on January 2, 1893, in company with Lieutenant Shileiko, who undertook the topographical and astronomical work of the expedition, as well as the magnetical observations.

At Irkutsk the explorers learned from Mme. Chersky (who had accompanied her husband during his last journey) that the mammoth

had been discovered much further east than had been supposed—40 miles south of Svyatoi Nos, the starting-point of Dr. Bunge's expedition to the New Siberia Islands in the year 1885. On March 21, the explorers left Irkutsk. They soon reached the Aldan, whence they began to travel in reindeer sledges. The Verkhoyansk range was crossed by the Tukulan pass, 5000 feet high, and from Verkhoyansk the explorers went westwards, across the Omoloi mountains, to Kazachiye village, which was reached on April 8. Talking there with his old acquaintances, Baron Toll came to the conclusion that he would be able to make in this same spring an excursion to the New Siberia Islands, travelling in dog-sledges on the ice. He started immediately after Easter, with M. Sannikoff and several men, to visit the place where the mammoth body had been seen, 170 miles north-east of Ust-Yansk. Four days later they were at work, and in two days the men, who already had won some experience in this sort of work during a previous expedition, had reached the mammoth. However, Sannikoff's hopes were not fulfilled. Only small pieces of the skin, with the wool thereon, parts of the extremities, and the lower jaw of a young mammoth were unearthed. The skull had long since been broken, and the tusks had, of course, been taken away. These relics were all lying in recent alluvial sands, deposited by the Sanga-Yuryakh river, which had washed them out from the underlying post-tertiary beds. It was thus decided to return later to the spot, when it would be free of snow, and in the mean time to pay a visit to the islands.

On May 1, MM. Toll and Shileiko, accompanied by one Cossack and three Lamutes, left the mainland and landed on the south coast of the Malyi Lyakhov island. Exploration was begun at once, and at the very start M. Toll came across the interesting fact that under the perpetual ice, in a sweet-water deposit, which contained pieces of willow and bones of post-tertiary mammals (the mammoth layer), were complete trees of *Alnus fruticosa*, 15 feet long, with leaves and cones. It was thus evident that during the mammoth period tree-vegetation reached the 74th degree of latitude, and that its northern limit stood at least three degrees farther north than it stands now. The importance of this discovery is self-evident.

Moreover, at this spot, as well as during further exploration, especially on Kotelnyi Island, the origin of the thick layers of ice which are seen everywhere under the sweet-water post-tertiary deposits of the New Siberia Islands could finally be settled. It was obvious that this ice did not originate from snow; it has everywhere a granular structure, and must be thus considered as originating from the ice-sheet of the Glacial period.

The geological history of the archipelago during the Devonian period could also be surmised. As to the present conditions of climate and animal life, they appeared under a quite different aspect from what

they were in 1886. In that year, even on May 13, the temperature was 6° Fahr.; while in 1893 it was raining on May 6 on the Great Lyakhov island. True, this was the first rain of the season, and it was followed by snowstorms, but it was a forerunner of summer. In reality, on the Kotelnyi island, the west coast of which was followed by the expedition as far as 75° 37′ N. lat., the first winged guests made their appearance in the middle of May; the gulls first (*Larus argentatus*), then the geese, the Turkans (*Sommateria spectabilis*), the *Tringa islandica*, the Robber Gull (*Lestris pomarina*), and others. The latter found plenty of food in the mice (*Lemmus obensis*)—the only winter inhabitants of the islands. The mice displayed a feverish activity; some of them migrated from one island to the other, others migrated to the continent, while others again came from the continent to the islands. White bears were met with frequently enough. One of them, an old giant, well fed on mice, was killed by Lieutenant Shileiko, and food was thus obtained for the dogs, with which—having no proper food (dried fish)—the party had to share the wild reindeer killed by the clever Lamute hunters.

On the return journey frosts became less and less frequent, and the travellers had themselves to drag their sledges, as the *toroses* (heaps of ice), which are well cemented together by hard snow during the winter, were now loose, protruding amidst a loose snow or surrounded by water. Still, the return journey, 150 miles, was performed without accident, and all the instruments and collections were safely landed on the mainland on June 8.

The second part of the journey, over the *tundras* and across the Khara ulakh range to the Lena, was accomplished on reindeer-back, the expedition only dividing into two parties at Aijergaidakh, as Baron Toll had to revisit the mammoth spot. Now that the snow had gone, it was further confirmed that only parts of an incomplete corpse were buried at this spot; no further relics could be unearthed.

The ride on reindeer-back, from the Svyatoi Nos to the Lena, a distance of 800 miles, proved that the tundras can be crossed at any time of the year if the traveller rides a good reindeer, which easily crosses the most swampy places, and when he has in addition, for crossing the rivers, a *vyetka*, that is, a boat made out of a poplar tree, or of three larch planks. During this journey the two explorers had again an opportunity of making a fuller acquaintance with the peculiarities of the polar climate. In July, at the shores of the Arctic Ocean, in lat. 72°, the temperature was 93° Fahr. above zero, and the sky remained quite clear all the time, thus favouring very much Lieut. Shileiko's observations; however, the heat made them suffer a great deal from the gnats.

After having crossed the Khara-ulakh range in two separate parties, they met together at Kumakh-sur, where they took a boat, in order to descend the Lena and to explore its delta. The weather was not very favourable on account of wind and rain; nevertheless, they sailed with-

out accident past the steep rocky banks of the great river and its islands, which are dangerous, especially at Tas-ary, there being not one landing-place for scores of miles. During the stoppages, interesting palæontological collections, chiefly Triassic, were made, and some interesting photos of ice-banks were taken. The delta was crossed by following one of the countless branches of the river, one which was not marked on the maps. Only owing to the great experience of the boatman could they reach without accident the mainland at the Olokhon-Cross, whence they had only 66 miles to cover in order to attain the mouth of the Olenek.

Bolkalakh was chosen as a spot for accurate determinations of its astronomical position and a basis for further surveys. But while Lieut. Shileiko was at work, Baron Toll was making excursions in the neighbourhood. He re-established the cross on the grave of the great explorers of the last century—Pronchishcheff and his wife—who died here from scurvy in 1737, and he made collections of Triassic and Chalk fossils, first discovered here by the late Czekanowski, the spot giving an excellent basis for the further geological exploration of the Anabar region.

On August 24, they started westwards in a long caravan of nearly fifty reindeer, in order to explore a region which had not been visited by a European for more than 150 years, since the times of Lapteff and Pronchishcheff. They had only one guide, a Dolgan, and five Yakuts. The chief aim of the expedition, the bay of the Anabar, was reached on September 2, at Cape Buskhaya. Good weather soon set in, and for a full month they had a succession of bright and warm days. Lieut. Shileiko was thus enabled to make a fundamental survey (compass and distance-measurer) of Anabar Bay, as well as of the Anabar river, as far as the mouth of the Uja, at the limits of tree-vegetation—that is, for a distance of 270 miles. At the same time, the high crags of the bay and the river (attaining in places heights of 300 feet) afforded Baron Toll the possibility of obtaining a full picture of the geological structure of the region, and to gather a rich collection of the fauna of the Lower Chalk deposits, of which the plateau between the Lena and the Anabar, and probably also the country farther north, up to the Khatanga, is composed. In the five different horizons of the Lower Chalk, which he thus investigated, he found all the Mesozoic fossils, and especially the ammonites of doubtful age which had previously been found in North Siberia, either isolated or in boulders, and thus he was enabled to ascertain their proper place in the succession of fossils of that age. The question as to whether the Boreal part of the Jurassic sea reached what are now the coasts of Siberia, will probably have to be answered in the negative.

As to the distribution of land and sea in post-tertiary times, the coasts of the Anabar bay, especially at Buskhaya, are very instructive. In one cliff, one may see that the Lower Chalk deposits are covered with a layer of angular boulders, twenty feet and more in diameter,

together with smaller ones, many of them being polished and scratched. They consist of a dolerite basalt, which appears *in situ* only 270 miles above Buskhaya. This layer cannot be considered as anything else than a moraine. It is covered by a layer of granular ice, which is covered in its turn by a layer of loess. Traces of glaciation which had not been hitherto discovered in Northern Siberia are thus evident, and the boulders which were found by Middendorf and Fr. Schmidt in the region once invaded by the post-tertiary sea, are boulders which have been washed by the sea out of the glacial deposits.

After having completed their work on the Anabar, the explorers, instead of returning by the already known route to Bulun, preferred to take a new one, and to connect their surveys with the well-known spot, Dudinskoye on the Yenisei, which is well connected by surveys with Turukhansk and Yeniseisk. However, Baron Toll had still to go first back to Bulun, in order to settle his accounts with the tradespeople who had advanced supplies for the expedition, and to take his collections, which had been brought in the mean time from Kazachiye to Bulun. As to Lieut. Shileiko, he lost no time in moving westwards:—towards the great lake Olokhon-kol, and thence to the entrance of the Popigai into Khatanga bay, and up the Khatanga river, in order to meet Toll at Khatangskoye village. So they parted on September 30, in full summer weather; but four days later, the *tundra* was so well covered with snow, that the journey could be continued on sledges. This was a great comfort after having made a ride of no less than 2000 miles. On November 5, Baron Toll was back on the Anabar, after having been at Bulun and stayed there for full ten days. Moving westwards, he crossed the plateau which separates the Anabar from the Khatanga and is watered by the Popigai and the Bludnaya, and is formed of a mass of dolerite basalt. The days grew shorter, snowstorms were not unusual, and the frosts attained 53° Fahr. below zero. Nevertheless all went well, and on November 16 the two explorers met at Khatangskoye, both in good health.

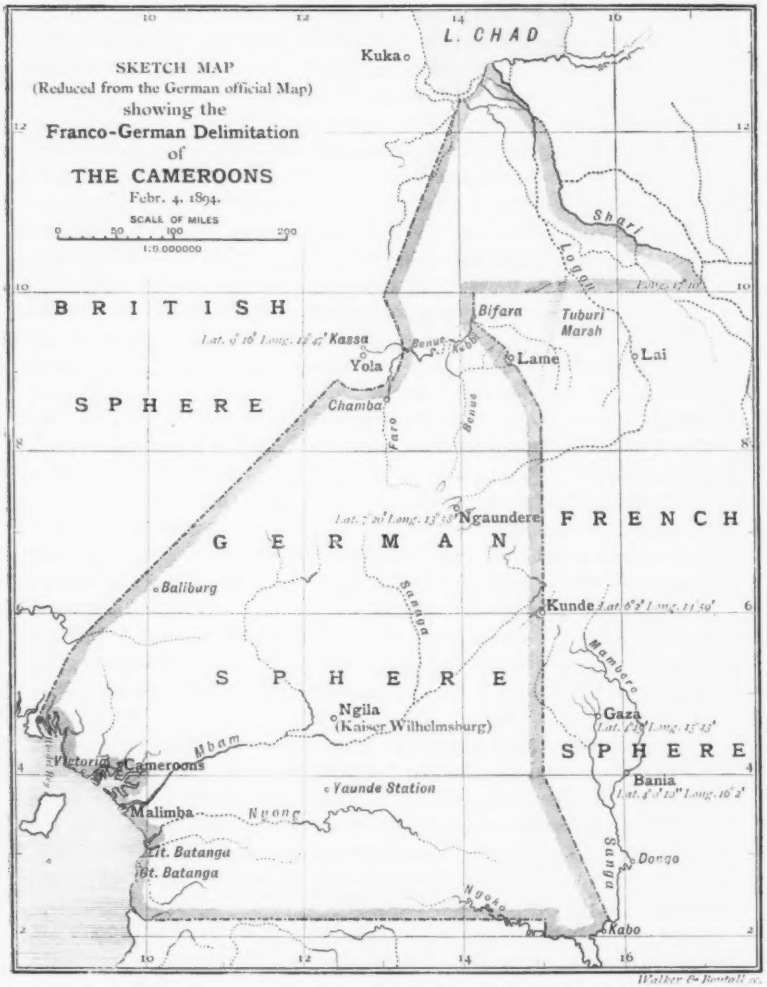
Thence they started for their home journey, which they accomplished with remarkable rapidity. It took them only ten days to reach Dudino (or Dudinskoye), on the Yenisei, and one month to reach Yeniseisk. Twenty-three days later they were at St. Petersburg, the whole journey from Khatangskoye having thus taken only fifty-three days.

The results of the expedition are—over 3000 miles of survey, based upon thirty-eight points, astronomically determined; nine months of meteorological observations in the *tundras*; hypsometrical measurements along the whole of the route; 150 photographs; and very rich collections, botanical, zoological, and ethnographical.

Nothing need be added to show the importance of this extraordinarily successful expedition, during which the arctic tundras have been explored by two such excellent explorers for nearly fifty degrees of longitude.

THE FRANCO-GERMAN TREATY AND THE "HINTERLAND" OF CAMEROONS.*

THE dispute between France and Germany about the Hinterland of the Cameroons Protectorate has been settled by a convention signed at



Walker & Boutall sc.

Berlin on February 4. The boundary, as now defined, begins on Lake Chad, at the mouth of the Shari, ascends the river to Lat. 10° N., and

* For the Anglo-German Arrangement, see *Geographical Journal*, January, 1894.

then follows that parallel to the meridian of Bifara, a village at the head of the navigation of the Mayo Kebbi, one of the headstreams of the Benue. That place, as well as Lame to the south-east of it, is allotted to France. From the latter the boundary follows a straight line to the intersection of the parallel of 8° 30′ N. and the meridian of 15° E. of Greenwich. The meridian mentioned forms the boundary as far as Kunde, but further south it is to be formed by a line passing 43 geographical miles to the west of Gaza and 62 miles to the west of Bania, and reaching the river Sanga at a point 18½ miles to the north of where it crosses the parallel of 2° N. It then follows that parallel to the Ngoko, a western tributary of the Sanga, and finally passes along that river to its intersection with the old boundary-line, which reaches the coast at the Rio Campos.

The important ivory marts of Kunde and Gaza have thus been assigned to France, whilst Germany has been conceded access to the navigable Sanga, a tributary of the Congo. In laying down the boundary no notice whatever has been taken of existing political or tribal divisions, and Adamawa now lies within three European "spheres," those of England (who holds the capital, Yola), of Germany, and France. The total area of the German Protectorate of "Kamerun," as the name is spelt in German official documents, is 188,400 square miles, accepting the boundaries as they are delineated upon the map accompanying the treaty.*

THE SAHARA.†

Dr. Schirmer has done good service in summing up in a convenient form our present knowledge of the Sahara. His work includes an investigation, on the one hand, of the causes which have brought about the existing facts of its physical geography, and, on the other, of the influence exercised by such physical characteristics on the life of its inhabitants. The results being arrived at by a careful examination of the whole body of facts accumulated by the labours of explorers and geologists, or to be gathered from the writings of historians, it may be taken as a trustworthy exposition of the conclusions which the present state of our knowledge allows us to form.

The old theories as to the origin of the desert are proved incorrect by what we now know of the variety both of geological formations and of relief. It is in the *régime* of the winds (though not in the way originally supposed) that the true explanation is to be found. The

* We need hardly mention that the Portuguese discoverers of the coast of the modern Protectorate called the principal river Rio dos Camaraôs, or Shrimp river. The transfer of such an application to a mountain or a vast territory cannot be called a very happy idea.

† 'The Sahara,' by Henri Schirmer. Paris, Hachette, 1893.

Sahara is, in fact, a monsoon region, with a general influx of air-currents in summer, and divergent winds or calms in winter. In the latter case dryness results as a matter of course, while in the former the greater contrast in temperature with the Mediterranean in the north than the Sudan in the south causes a preponderance of the northern monsoon, and although this blows from the sea, it is by its very direction a dry wind. Secondary causes, such as the barrier formed by the Atlas range, also add their effect. The mountainous regions, however, such as Aixaye Tibesti, are favoured with regular summer rain, and in other parts occasional storms arise from upward currents by which the lower strata of the atmosphere are cooled. The intense evaporation leads to a progressive diminution and concentration of surface waters, giving rise to the *Chotts* and *Sebkhas* so common in the desert, while the original relief of the ground, due to running water, has since been modified by other agents, notably the atmospheric disintegration of the rocks, and the erosion and transport of material by the wind. Vast accumulations of sand-dunes and chaotic forms of surface result, by which the ancient hydrographic systems are often completely masked. The water which falls in the mountains makes its way for long distances underground, the position of artesian springs being determined by the structure of the ground. Much water is often found beneath the sand-dunes, in which it is held as in a sponge. With reference to the opinion which has been held, that the climate has changed within historic times, Dr. Schirmer gives cogent reasons for thinking this unlikely, an important one being the great specialization of the Sahara flora, necessarily the work of a great length of time.

An interesting chapter is devoted to the flora and fauna, and to the special means by which these adapt themselves to the extreme temperature. Coming next to the human inhabitants, while it is impossible yet to decide whether the Berbers were the original occupants, the author shows on what insufficient grounds the idea has found favour, that traces of a distinct race with negro affinities exist, these occurring chiefly along the main caravan routes, where a constant movement of negro slaves has taken place. The existing races have adapted themselves to the climate, which with a suitable diet is decidedly healthy, and, although of spare habit, are noted for the power of resisting fatigue and for longevity. The moister oases are less healthy, and the dark colour of their inhabitants is probably due to the greater power of resisting malaria shown by the negro element. The broad division of the population is that between nomads and the stationary element. The general characteristics of the desert all invite to the former mode of life, which, however, can only be maintained when reinforced by the proceeds of plunder. The inhabitants of the oases, with their various appliances for cultivation, are more advanced in civilization, but are always at the mercy of the nomads, and often live in relations of servitude to them.

A general state of misery and decadence results, and the supply of necessaries never comes up to the demand.

This want can only be supplied by commerce, which the two staples of the desert, dates and salt, render possible. Besides the local interchange of products, the portion of the Sahara between Europe and the wholly different world of the Sudan, has led to a transit trade across it, which was probably carried on as far back as the Roman epoch. According to the features of the country, natural routes, such as that from Fezzan to Lake Chad, have come into use; and from the writings of the Arab historians, Dr. Schirmer traces the vicissitudes to which the chief of these have been subject since the ninth century, A.D., according as the rise or fall of native empires (such as that of Melli) have brought one or another into prominence. The trans-Saharan commerce has a complex organization, and requires much mutual co-operation, the merchants subsidizing the nomads, to secure their good-will and protection. The volume of trade, however, is surprisingly small, judged by modern standards.

The concluding chapters deal with the history of European enterprise in the Sahara, and the possibilities of future development by France, the subject of the proposed trans-Saharan railway being carefully considered. The author shows the exaggerated notions which prevail as to the wealth of some of the countries which it might tap—especially Timbuctu and the Central Niger, for which, moreover, the Senegal is the natural outlet. The Haussa countries, on the other hand, are held by England. Thus, although the hostility of the natives makes the railway the only feasible way of opening the country, one must not be too sanguine as to the advantages to be gained. While all schemes for the general reclamation of the Sahara must be viewed as visionary, much may be done by Europeans in the way of improved cultivation of the oases.

Some excellent illustrations are given, showing typical forms of Saharan scenery.

THE EXPLORATION OF THE LUKUGA.

THE mystery of the Lukuga exists no longer since M. Delcommune has traced that river from Kalumbi, the furthest point reached by Mr. Joseph Thomson in 1879, to its confluence with the Lualaba. M. Delcommune, with his companions Dr. Briart and Didderich, reached Lake Tanganyika on August 20, 1892. It was his intention to trace the Lukuga from the point where it leaves the lake, but the disturbed state of the country prevented this plan from being carried out. In consequence of this state of affairs he was compelled to make his start from Mpala, much further to the south. Having left that place on October 6, 1892, he

reached Kalumbi on the 21st, and thence followed the river as far as the Lualaba, reaching the confluence on November 13.

The upper Lukuga traverses the Kakazi Hills in a gorge bounded by steep rocks rising to a height of a thousand feet. Near Wakensa's village, about 30 miles below Kalumbi, and 90 miles from the lake, the valley of the river widens and becomes marshy. Soon, however, the river once more flows through hills, and forms rapids, until at Bulu, only 35 miles from the Lualaba, it finally enters a broad plain, and divides into numerous branches enclosing large islands between them. The total fall of the river between the lake and the Lualaba, a distance of 235 miles, amounts to 1035 feet.* The river is navigable only below Bulu, and its volume was found to be very small, although there is evidence that immense floods rushed down it at some previous epoch. Rocks, the surface of which had evidently been smoothed by water, now rise as much as 25 feet above the present level of the river; whilst shells, carried down from Tanganyika, are discovered far away in the valley. Everything tends to prove that the Lukuga was not always an outlet of the lake, but only became so at a time when the latter had risen to an extraordinary height, and its pent-up waters forced themselves a passage through this the weakest portion of the enclosing rampart of hills. At its mouth the Lukuga was found to be 187 feet wide, and 5 feet deep, and its discharge amounted to 50 cubic meters a second. This, however, was in the middle of November, in the dry season.

The country to the south of the Lukuga consists of a succession of undulating plains with scattered clumps of trees, and irrigated by numerous streams. The Baluba, who inhabit this country, are nominally dependent upon Simbo, one of Msiri's sons, who resides at Ankoro, on the Lualaba, 70 miles above its confluence with the Lukuga. They are a brave people, and with their bows and poisoned arrows have victoriously repelled the Arabs. On the middle and lower course of the river the population is very dense, and the villages are surrounded with plantations of manix, and there are also a few groves of bananas. The first oil palm was observed near the Niemba, a southern tributary of the Lukuga, at an elevation of 2750 feet above the sea. Goats and poultry abound, and the Lukuga swarms with hippopotami and crocodiles.†

* Assuming Lake Tanganyika to be 2665 feet, as computed from several months' barometrical observations by Mr. Popelin, and the confluence to be 1630 feet as determined by M. Delcommune. According to Captain Stairs, the lake-level is 2654 feet.

† *Le Mouvement géographique*, No. 7, 1894.

THE MISSING SWEDISH EXPEDITION.

Mr. Stein has announced that his expedition has been postponed. Consequently all hope of succour for the lost Swedish explorers, Bjorling and Kallstenius, has had to be abandoned through that agency. Mr. Nilson has, however, left Dundee as a passenger on board the whaler *Eclipse*, in the expectation of being able to reach Cape Clarence next July or August. Dr. Ohlin has also proceeded to St. John's, Newfoundland, in the hope of obtaining a passage in another whaler. The *Aurora* is expected to return to St. John's on April 25, but it will not be decided until then whether she is to extend her voyage to Baffin's Bay this year. If not, Dr. Ohlin hopes to obtain a passage during the summer in the *Falcon*, when she goes north to bring back Mr. Peary's party.

The President appealed for subscriptions to the "Björling Relief Fund," in a letter to the *Times* of April 7, being anxious to help the Stein expedition, as well as to send a contribution towards the aid of such measures as were adopted in Sweden to succour the gallant young explorers or to ascertain their fate. As the Stein enterprise is postponed, the proceeds of the "Björling Relief Fund" will now be entirely devoted to the latter object; and those English geographers and Arctic officers who have subscribed will thus be able to show their sympathy for the fate of the two young martyrs in the cause of science. It must be remembered, also, that the two men who are with the Swedish explorers are Britons. The name of one is Gilbert Dunn; of the other, Herbert Macdonald.

It is necessary, for the efficient performance of the duty connected with these lost explorers, that a vessel adapted for ice navigation should at once be bought or hired, that a proper commander should be found, and that she should be despatched to Baffin's Bay. After visiting the Cary Islands, her orders should be to proceed direct to Cape Clarence, and obtain the information contained in Bjorling's cairn. Her commander's future proceedings will subsequently be guided by the record in the cairn. It will be necessary to make a thorough search northwards from Cape Clarence to Cape Faraday, and southwards to Jones Sound. Having rescued the missing men, or ascertained their fate, the vessel would return in the autumn.

Two British subjects, lost under such circumstances, cannot be abandoned to their fate without something very like discredit to this country, and the deadly peril surrounding the brave young Swedish heroes concerns every civilized people in the world.

THE MONTHLY RECORD.

THE SOCIETY.

The Duke of York.—At the meeting of the Council of April 9, H.R.H. the Duke of York was elected an Honorary Member of the Society. At the same time it was resolved to request His Royal Highness to allow himself to become an Honorary President of the Society. The Duke has been graciously pleased to accede to this request.

Royal Medals and other Awards for 1894.—The Royal Medals of this year for the encouragement of geographical science and discovery have been awarded by the Council as follows:—The Founder's Medal to Captain H. Bower, for his remarkable journey across Tibet, from west to east. The Patron's or Victoria medal to M. Elisée Reclus, for the eminent services he has rendered to geography, as the author of the 'Nouvelle Géographie Universelle,' which has just been completed in nineteen volumes after labours extending over twenty years. The Murchison Grant has been awarded to Captain Joseph Wiggins, for his services, extending over a quarter of a century, in opening up the Kara Sea route to Siberia, and the navigation of the river Yenisei. The Back Grant to Captain H. J. Snow, for his rectification of the chart of the Kuril Islands, the result of observations made during many years' voyages. The Gill Memorial to Mr. G. E. Ferguson, a native of Sierra Leone, for important cartographical work in West Africa. The Cuthbert Peek Memorial to Dr. J. W. Gregory, on account of his journey to Lake Baringo and Mount Kenia, and the series of useful scientific observations made by him. The three Honorary Corresponding Members chosen are, Dr. H. Mohn, Director of the Meteorological Institute, Christiania; Mr. Justin Winsor, Librarian of Harvard University; and Mr. Frederick Jeppe, of Pretoria, South African Republic.

The Remainder of the Session.—The following arrangements have been made for the evening meetings during the remainder of the Session:—On May 7 Colonel Sawyer will give an account of his journeys in the Bakhtiari country; on May 21 an extra meeting will be held to hear Mr. Theodore Bent's account of his recent expedition to Hadramaut, South Arabia; on June 18 Dr. H. R. Mill will describe the results of his survey of the English lakes; and on June 25 Dr. G. S. Robertson will give some account of Kafiristan, in which he has resided for so long.

Honour to the Society's Librarian, Dr. Mill.—The Royal Society of Edinburgh has awarded the Makdougall-Brisbane Prize, a gold medal, to Dr. H. R. Mill, for his researches on the physical geography of the Clyde Sea area, which extended over nearly three years. The results were communicated to the Royal Society of Edinburgh in three parts:

I. Physical Geography; II. Salinity; III. Temperature. The first two have been published in the *Transactions R.S.E.*, and the third is in the press. The main features of the work are the elucidation of the effect of configuration on the seasonal march of temperature in water, and of the action of large bodies of water in modifying the climate of the surrounding land.

The Anniversary Dinner.—The anniversary dinner of the Society will be held in the Whitehall Rooms, Hotel Metropole, on the evening of the anniversary, May 28th. Full particulars will be found in the Notice to Fellows on p. iv of the advertisement pages.

EUROPE.

Bathymetrical Survey of Haweswater.—Dr. H. R. Mill and Mr. E. Heawood continued their systematic soundings in the English lakes by a survey of Haweswater in the last week of March. This lake is particularly interesting on account of its situation and outline. It is the highest of the English lakes, having its surface 694 feet above Ordnance datum, and occupies the lower end of a narrow valley, the sides of which slope steeply, and the upper end as well as at least one tributary valley bear evidence of the former existence of lakes of similar form. About one-third of Haweswater at the lower end is nearly cut off from the rest by a great delta formed by the Measand Beck, and is named Low Water, while the rest of the lake is called High Water, and the narrow channel connecting the two is termed the Straits. Low Water was found to be very shallow, only a small patch near the Straits being over 25 feet in depth, and in that there was one sounding of 52 feet. High Water presents the usual features of a mountain lake, being a narrow, steep-sided, almost flat-bottomed trough. Near the centre there is a small area, the depth in which exceeds 100 feet, but the deepest sounding found was only 103 feet. Thus Haweswater, so far from being the deepest lake, as was formerly supposed, is surpassed for shallowness only by Derwentwater, Bassenthwaite, and Buttermere. Wastwater, Windermere, Ullswater, Coniston, Ennerdale, and Crummock, are all deeper. A complete account of the soundings made in the lakes, and a discussion of their bearing on the geography of north-western England, will be presented to the Royal Geographical Society at an early date.

The Geology of the Alps.—In connection with the London University Extension Classes, a course of ten lectures was recently delivered at Croydon, by Miss M. M. Ogilvie, D.Sc., on "The Geology and Scenery of the Alps." This is probably the first occasion on which the subject has been fully and systematically treated before an English audience. In April, 1884, Prof. Bonney gave a lecture before the Royal Institution on "The Building of the Alps" (*Nature*, vol. 30, pp. 44, 65); which is still most useful as a general summary of the subject, but so wide a question could not be fully discussed in one lecture. Miss Ogilvie proposes to arrange her lectures for publication; the result will be most welcome, as no separate work on the subject exists in the English language. The three introductory lectures were devoted to general questions bearing on the main subject—denudation, sedimentation, volcanic phenomena, Earth-movements, general structure of mountain ranges, etc.; the fourth gave a short sketch of the Alps as a whole; four lectures discussed the various areas in detail—Western Alps, Eastern Alps, Bavarian Alps, and North Tyrol, "Dolomites" of South Tyrol. The ninth lecture was devoted to the Mid-Tertiary and succeeding epochs of transition in the Alps; the last lecture gave a wider view of mountain-structure, more especially of the various mountain-chains of Europe. The relation of geology to physical geography was discussed

throughout; the nature of the rocks, the foldings to which they have been subjected, and the enormous denudation which the area has undergone, being clearly brought out. Reference was also made to the influence of geological structure in determining the distribution and history of the people and lines of communication.

A Caucasian Guide Book.—Mr. Douglas Freshfield, with the assistance of Mr. Mummery, Mr. Woolley, and other recent travellers in the Caucasus, has in preparation a Climber's Guide to the portion of the Caucasian chain between Kasbek and Elbruz. It will contain a complete table of routes from England, with time-tables, cost, and a selection of routes to the mountain centres from the chief towns on both sides of the chain, as well as such details as to the topography of each district and the expeditions already accomplished as can be collected from mountaineering journals. Four district maps will be given, and probably a few outlines from Signor V. Sella's panoramas. As two of the maps, originally produced for the Royal Geographical Society, have been taken off the stone, the edition will be necessarily limited to 150 copies. It is hoped that the book will be issued in the spring of 1895.

ASIA.

Mr. Bent's Expedition to Hadramaut.—Two letters have been received from Mr. Theodore Bent reporting the successful termination of his expedition to Hadramaut. The first, dated Shehr, March 7, 1894, says: "We have again reached the coast after manifold adventures in the interior. We managed a journey north of the Hadramaut valley, which brought us to the sand and the confines of the great central desert. Here we found a ruined city, and one of the sacred places of the country which interested us. Then we got two tribes to take us eastwards to some valleys running north into Hadramaut, and then we came back here by another and, as it proved, very dangerous road. We were fired at from places by hostile villagers, and on one occasion the bullets struck close to our horses, but luckily no one was hurt. We had endless difficulties with our camelmen and guides, and at one time our position looked exceedingly serious. The Sultan here has received us very well, and is arranging for another trip eastwards, which will take us about a fortnight; we shall then proceed by dhow to Aden on our way home. I hope by the end of April we shall be in England. Imam Sharif (the Indian Surveyor) has made an excellent map of all the country we have passed through, and our botanist and naturalist have done good work, so I hope we shall be able to give a good account of ourselves when we return." The second letter is dated Aden, March 28. "Here we are back again, safe and sound. We made another expedition nearly to Seehut, which gave us the bearings of the Hadramaut valley to the coast, but it was not attended with much archæological success. Most of the ruins appear to be further inland; however, we have a good supply of them from the other expedition, and this latter was topographically of value. Imam Sharif has done his mapping splendidly, and is preparing me a rough tracing of his work here, to be followed by a more detailed edition, when he has had time to work up his observations carefully in India. We have to wait here for a boat till April 8, and shall not be home before the 24th. However, we rather want a rest, and Mrs. Bent wants time to develop her photographs." Meantime Mr. Bent has returned to England, and will give a paper on his journey at an early meeting of the Society.

Demarcation of the Indo-Afghan Frontier.—One of the arrangements recently arrived at between the Amir of Afghanistan and Sir Mortimer Durand relates to the demarcation of the contiguous districts of the two countries on the Indian north-western frontier. Three officers have been appointed for the Khaiber, Kuram, and Baluchistan sections respectively, the political officer in the Khaiber

being in charge of the first. Here the border-line west of the Sitsobi Pass, at the head of the Bara valley, already follows the crest of the hills to the Safed Koh, overlooking the Kuram valley. East of Landi Kotal a line will have to be drawn to the Kabul river, a few miles below Fort Dakka and Lalpura. Hence to the southern extremity of Chitral territory, above Asmar, the boundary will be the range of hills dividing the Mohmaud country from Bajaur. In the Kuram valley Mr. Merk will start from the Sita Ram peak of the Safed Koh, and follow the crest of the hills between the Kuram and Khost rivers until the latter is struck. For the demarcation of the Waziri border, south of the Khost river, final arrangements are not yet made; but in the Zhob valley, Lieut. McMahon, with Captain Mackenzie as survey officer, will start from Kandar Domardi, the junction of the Kandar and Gomal rivers, and demarcate the whole of the Kakar country to Chaman, and thence southwards along the Shorawak borders. The portion from Shorawak to the Helmand is reserved for next season's work.

Miss Taylor's Recent Journey in Tibet.—Mr. W. W. Rockhill has sent us some interesting notes on the route followed by Miss Annie R. Taylor in her recent adventurous journey in Tibet. Miss Taylor, with five Asiatics, started from Tan-chau, in the Chinese province of Kan-su, on September 2, 1892. After crossing the Chinese border, they soon reached the Yellow River (or Ma-chu), which was crossed at its first bend westwards, and entered the Golok country, which is described as treeless and very hilly. Passing through the Sa-chu-Ka country, the party at length reached the Dre-chu. From Gala, a small town on the other side of the river, the route lay over the Rab-la, described as one of the most difficult passes in Tibet, to the large and important town of Ke-gu. Leaving Ke-gu, the tea road was followed as far as the Pau-gau Lamasery, where it was quitted for a mountainous route over the Pass O-mai, till Tash-e-Gumpa, situated on the river Tsa-chu, was reached. Having again struck the tea road, the party entered the district Damchung, watered by the Long-chu; crossing this river and the Dam-jau-er-la, one of the highest and most dreaded Tibetan passes, they at length reached the Sok-chu, the river followed up by Captain Bower on his late expedition. They were now in close proximity to the Bo-chu river, which confines the Lhassa district, the sacred province of U. Having crossed the Da-chu river, Miss Taylor's party were suddenly taken prisoners and so prevented from attaining their object. The return journey was made by way of Tash-e-gumpa, Ke-gu, along the tea road to Ta-chien-lu, and from thence down the Yang-tse river to Shanghai. In connection with this journey, Mr. W. W. Rockhill sends the following notes: "Miss Taylor, on leaving Tao-Chu (Kan-su), went to the great lamasery of Labrang (her La-ber-long), south of the Yellow River and on the border of China; thence she took a trail leading nearly due west through the southern part of the Golok country and across the upper Za (or Tsa) chu, the river which flows by Kanze, till she came to the upper Yang-tse-Kiang (or Dre-chu). She crossed this river between the point where A—— K—— crossed it in 1881, and where I did in 1889. Her Tash-e-gumpa is probably A—— K——'s Chioti gomba (my Chúché gomba). The Za-chu, I should say, she calls 'Sa-chu-Ka country.' Gala I am unable to identify, but it is certainly one of the numerous hamlets along the banks of the Dre-chu near Tumbumdo and Zonyik gomba (see A—— K——'s and my route maps). Having crossed the Dre-chu, Miss Taylor turned south and crossed 'the Rab-la, one of the most formidable passes of Tibet, and, leaving behind us the large town Ma-ni-tang, we came to the town Ke-gu.' In 1889, when going to Jyekundo (her Ke-gu and A—— K——'s Kegudo), I crossed the Taglung-la, altitude 16,650 feet above sea-level. She probably crossed this or a neighbouring pass. Her Ma-ni-tang embarrasses me—I know nothing about it, but perhaps it may be Tumbumdo; she does not say,

however, that she passed through it. Leaving Jyekundo, she probably travelled due south to near Chamdo (I heard of this route in 1889), and then, turning west, crossed the upper Tse-chu (her Tsa-chu). This river comes from the west or north-west. Then, following the eastern extremity of the great Dang-la range, she came to the Su-chu (her Sok-chu), about forty miles to the west (or north-west) of where I traversed it in 1892. From this point her route is clearer. She reached the Pon-chu (her Bo-chu), which is a large affluent of the Su-chu on the right bank, about forty miles west of my route, and thence continuing in a south-west direction, her route crossed mine a little to the east of Chingo (approx. lat. 32° 06′, long. E 92° 35′), and came some 50 miles further to the south-west on to the Dang-chu (her Da-chu), which forms the boundary between Lhasa and Jyade. Here she was about one day and a half north-east of Nag-chu-ka (her Nag-chu-ko-Kang), and on the high-road between Hsi-ning (Kan-su) and Lhasa. She was stopped by the same officials who, in August, 1892, blocked the road to Lhasa for me on the same Dang-chu, probably a day's ride higher up its course. The road she followed is indicated on my last route survey as the road to Jyekundo, and is known as the upper Jyekundo road, or Gong-lam. There are two other trails leading from Nag-chuka to Jyekundo (at least they are distinct in this part of the country), and known as the 'Middle road' (Bar lam) and 'Lower road' (Og lam). On the return journey, Miss Taylor followed from Jyekundo to Ta-chien-lu (Sa-chuan), exactly the same route as that taken in 1881 by A—— K——, and by myself in 1889."

Depth and Temperature of the Lake of Tiberias.—M. Th. Barrois, during his researches in 1890 into the deep-water fauna of this lake, added much to our knowledge of the contour of its bed (*Comptes Rendus* Paris Geog. Soc., 1893, p. 449). This was long based solely on the soundings taken by Lieut. Molyneux, R.N., in 1847, which gave the greatest depth as about 156 feet. The idea lately current that much greater depths existed, was due, M. Barrois shows, partly to an error in the seventh edition of McGregor's 'Rob Roy on the Jordan,' through the mistake of feet for fathoms, and partly to the report by M. Lortet in 1883 of depths of 820 feet, based on his dredgings when studying the fish of the lake. A number of lines of soundings taken by M. Barrois in the deeper northern part of the basin failed to reveal any such depths, which, if they occur at all, must be of the nature of a sudden abyss, such as has been found in the Lake of Annecy in France. M. Barrois's results agree well with those of Molyneux, and show that the deepest parts are in the axis of the Jordan valley and about the middle of the length. The thermometric observations also gave results agreeing with the general character of the lake as a shallow basin. They establish (1) the large daily variations of surface temperature; (2) the small depth of the zone subject to diurnal variation; (3) the uniform temperature of the deeper layers. This last is higher than in Swiss lakes of the same depth, owing to the difference of latitude and altitude, and to the existence of hot springs.

AFRICA.

Dr. Donaldson Smith's Expedition to Somaliland.—Dr. Donaldson Smith, a young American gentleman who has already been to Somaliland, is now in London organizing an expedition on a large scale, with which he hopes to penetrate from the north coast of Somaliland to Lakes Rudolf and Stefanie, and thus connect the explorations of Count Teleki and Lieut. von Höhnel with those that have been made further to the north. Dr. Smith is himself well qualified to carry out observations, and he means to take with him a scientific expert, whose work will add greatly to the value of the expedition. Dr. Smith hopes to leave before the end of May.

Mr. R. T. Coryndon's Expedition to Central Africa.—A few days ago, Mr. R. T. Coryndon, who has already had experience as a collector in Matabeleland, left England for the Zambesi, *viâ* the Cape. He means to proceed by Lake Nyasa to Lake Tanganyika. He will land on the west coast of the latter as far north as possible, and proceed to establish his camp in the Congo forest. Mr. Coryndon's main object will be to make collections in natural history, but he has qualified himself for carrying on geographical work, and as he will probably occupy his camp for a year or more, we may expect valuable results.

Machin and the Discovery of Madeira.—The romantic story of Robert Machin, an Englishman, who, in the reign of Edward III., is said to have fled his country with his lady-love, and to have been driven by a storm upon the island of Madeira, is referred to in most books dealing with the early discoveries of the Portuguese. One of the two capitanias of the island is at the same time stated to have been named *Machico*, in memory of the fortuitous discoverer of the island. Azurara, in his 'Chronica' (1453), mentions a capitania Machico, but says nothing about Machin; Galvão (1563) gives a version of the story, but calls the adventurer Macham; whilst a more circumstantial version of the legend first appeared in 1660, in Manuel de Mello's 'Espanafora amorosa.' J. I. de Brito Rebello, in a supplement to the 'Diario de Noticias' of Lisbon, published in commemoration of Prince Henry's centenary, rejects the story of Machin and his lady-love as being absolutely legendary, and suggests that the "capitania" was named after Machico, a Portuguese seaman, who was among the discoverers of the island, and died there. In proof that a seaman of that name existed he publishes a deed, recently discovered by Sr. Ernesto do Canton in the Torre de Tombo, by which King Ferdinand gives to one *Machico*, "mestre da sua barcha," a house in the Rua nova of Lisbon. This deed is dated April 12, 1379. The Machico, whose name is connected with the history of Madeira, may have been a son of this master of the royal "bark."

Baron von Uechtritz and Dr. Passarge on the Benue.—This German expedition promises to become of real importance from a geographical point of view; for Dr. Passarge, its scientific member, not only supplies geological information and collects natural history data, but he likewise makes astronomical observations and prepares a good map. The expedition arrived at Akassa, at the Niger mouth, on July 9, 1893, and being favoured by the Royal Niger Company, who courteously furnished it with a steamer, was able to leave for the Benue on the 11th. When beyond Ibi it met Herr von Stetten, on his return to the coast; and on its arrival off Yola, on August 30, 1893, M. Mizon, who had arrived on August 19, was still there with his two steamers. The Sultan of Adamawa received the members of the expedition most kindly, presented them with five horses—a great distinction—and gave them permission to depart. They left Yola on October 5, crossed the Benue, and travelled by land to Garua, on the Mayo Kebbe, where they arrived on October 13. The "Sultan" invited them to establish a station. They then turned to the south-east, but when nearing Rai Baba, the capital of Bubanjida, a country no longer tributary to Adamawa, they were attacked by a strong force, largely consisting of horsemen. This attack they repulsed successfully, although their whole force only numbered 80 porters. Since then they appear to have returned to Yola, where further instructions await them. Dr. Passarge furnishes interesting information on the geology of the country traversed. Once beyond the alluvial plains of the Delta, the Niger and Benue are bounded by sandstone plateaus, which generally begin at a considerable distance from the river, and are surmounted by crystalline rocks. The valley-plain of the river is covered with loam, and many of the hills which rise within it are of volcanic origin. The soil in the sandstone region is laterite, and savannahs predominate. Near Yola and elsewhere Dr. Passarge made astronomical observations,

which considerably affect our maps of that part of Africa. The Kasa Hill, close to the Benue to the north of Yola, lies, according to Dr. Passarge's observations, in lat. 9° 15·9′ N., long. 12° 46·5′ E. The longitude was obtained by observing eight culminations of the moon. According to Lieut. Mizon, who observed four eclipses of Jupiter's satellites, the longitude of his camp to the east of Yola is 12° 40·6′ E., which would place Kasa in 12° 39·5′ E. A good map of the country between Yola and Garua is published in the *Mittheilungen aus Deutschen Schutzgebieten*, 1894, Tafel 4.

The Longitude of Tabora.—The longitude of this, the most important place on the road from the east coast of Africa to the great lakes, seems at length to have been determined with sufficient accuracy for ordinary purposes of cartography. Captain Speke in 1864 placed Kaze (Tabora) in lat. 5° 0′ 52″ S., long. 33° 1′ 34″ E., his longitude being computed from eleven sets of lunar distances. Dr. Kaiser, who observed a culmination of the moon, places the Belgian station, due south of the existing German station, in long. 32° 53′ 10″ E. Dr. Rindermann made careful observations, in 1893, at a camp lying 1100 metres = 35″ due east of the existing German station. He was furnished with a superior theodolite, and had undergone a course of instruction. His longitude is dependent upon an eclipse of the moon, which occurred on May 11, the occultation of a star, and three culminations of the moon, the result being long. 32° 52′ 23″ E., whilst the latitude is 5° 1′ 14″ S. (*Mittheilungen aus Deutschen Schutzgebieten*, vii. 1894, p. 66).

AMERICA.

Pre-Columbian Voyages to America.—By special permission of the Pope, the Archives of the Vatican bearing on pre-Columbian voyages to America were searched for the first time in 1892, and facsimiles of the documents found were exhibited at the Convent of La Rabida during the World's Columbian Exposition at Chicago, and discussed in a paper by Mr. W. E. Curtis, published in the *National Geographic Magazine* for January, 1894. Mr. J. C. Heywood searched for and catalogued the various documents, the most interesting of which are those relating to the Bishopric of Gardar, in Greenland, and to the line of demarcation between Portuguese and Spanish influence. According to Adam of Bremen, who died in 1076, Norwegians first reached Greenland at the end of the ninth century, and the bishopric of Gardar certainly existed in 1124. The settlements on the American continent known as Helluland, Markland, and Vinland, though not admitting of absolute identification, witness to the civilizing influence of the bishops of Gardar. Letters of Pope Gregory X. in 1174 show that part at least of America was expected to furnish money for the crusades. The Archbishop of Drontheim informed the Pope that it would take him five years to visit his archdiocese, and six years to collect the tithes. The people, besides, had no money, and no grain or fruit was grown; they could only offer, for the expenses of the crusades, skins and teeth of animals. From a letter of Pope Nicholas V., it appears that in 1418 heathen foreigners with a fleet invaded the country, burned the buildings, and carried off many of the people. Some interesting documents relate to the line of demarcation. The kings of Portugal had for many years demanded from the popes exclusive rights of discovery and colonization on the western coast of Africa. These demands were granted until they covered all the region from Ceuta around Africa to India. Columbus, believing that he had only discovered a new route to the eastern part of India, Ferdinand of Spain secured three papal letters to prevent any interference with the new claims of Spain. A letter of May 3, 1493, gave to Spain exclusive right to all lately discovered lands, and islands which might still be found if not already possessed by some Christian power. Another letter, dated May 4, gives a definition of the

famous line of demarcation; that line is fixed 100 leagues to the west and south of the westernmost island of the Azores. "To the south" was added because the region was particularly desired by both Spain and Portugal. In proposing this line to Pope Alexander VI., the Spaniards only knew that it would fall far from San Salvador, and that it might prevent jealousy on the part of Portugal if Spanish ships were kept 100 leagues from the most western of the Portuguese possessions. But the Portuguese at the same time believed San Salvador to be part of India, to which they claimed an exclusive right. In June, 1494, the demarcation-line was moved 170 leagues further west, a change which unwittingly gave Brazil to Portugal. Mr. Curtis's paper contains a translation of the text of all the letters and other documents to which reference has been made.

The Shawangunk Mountain in New York State.—Mr. N. H. Darton has an interesting paper in the current number of the *National Geographic Magazine* describing a very clear instance of rock-structure influencing geographical forms. The Shawangunk mountain in Ulster County, New York, is a long ridge undulated into longitudinal valleys, along which streams flow northward parallel to the axis of the mountain. The western edge is marked by a series of magnificent cliffs towering over gentler though still abrupt slopes. The margin of the cliff is cut into headlands, and runs back into deep bays like a sea-coast, and in some of the bays there are cliff-bound lakes of great beauty, which are popular summer resorts. Geologically the structure is simply a sheet of hard white grit, in part quartzite, in part conglomerate, and not more than 300 feet thick. This rests unconformably on a much thicker mass of soft Hudson shales; and the whole has been crumpled into a mountain-ridge and reduced by erosion to its present form. The cliff-line marks the edge of the sheet of grit, and the soft shales beneath are weathered into slopes, which are removed so rapidly by sub-aërial erosion as to undermine and cut back the cliffs at many points. Vertical jointing promotes the precipitous forms of the edge of the grit. The paper is illustrated by several sections, and an ingenious stereogram representing a model of the district dealt with, cut into six blocks, and showing at a glance both the superficial configuration and the geological structure.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

The Hydrography of Fresh Water.—In a series of articles in the *Annales de Géographie* (October, 1892, April, 1893, and January, 1894) M. Marcel Dubois has dealt with the methods by which the phenomena of fresh-water circulation should properly be studied, with an attempt at a more rational system of classification than those generally in use. Nothing, in fact, can be more unscientific than the consideration of river-systems as so many units, without regard to the distinctive characteristics impressed by conditions of climate and relief, as, *e.g.*, the comparison of the Siberian rivers, fed by a scanty rainfall and frozen for a large part of the year, with those of moist tropical climates. The only legitimate basis of comparison is that of the total amount of water discharged in a year in its relation to the extent of country drained. Lakes (which must be included with rivers in the investigation, since there is no hard and fast division into two categories) and glaciers are among the facts of climate and relief, of which the effect is more marked, both affording means of storage of water, and so tending to regulate the flow. Taking the various climatic zones separately, it is, of course, in that of the tropical rains that the greatest rivers occur, and in this the large islands (as those in the Malay Archipelago) and in a less degree peninsulas (India, Indo-China) have the largest of all in proportion to the area drained. Of these two peninsulas, the former, from its soil and relief, is more subject to the effects of

evaporation. The great continental masses of Africa and South America differ in important respects, the former (owing to its relief) being marked by the presence of lakes and cataracts, which help to retain the water, while in the latter, the extent and regularity of the plain of the Amazon give an example of simple downflow on the vastest scale. Facts of climate and soil are more operative in the former, causing various degrees of evaporation and absorption. In the temperate zone (omitting certain regions where the tropical monsoons encroach) the North American plain is marked by its huge lakes, where, however, the circulation (partly owing to winter freezing) is far inferior to that in Africa. In Europe and Asia glaciers play a most important part. The former as a whole is copiously supplied by the winds from the Atlantic, but eastwards the rains diminish, and the Siberian rivers lose their importance when we consider for how large a part of the year stagnation reigns. In the southern temperate zone the area is small, but striking contrasts result from geological features. Finally, in the Polar regions the phenomenon of circulation in the form of glaciers becomes rather a secular one.

Shore Formation near Hyères.—A peculiar instance of littoral formation is noted by A. Salaignac in the *Annales de Géographie* (vol. ii. p. 448, with illustration). The Roubaud is a small stream which flows through Hyères and takes an east-south-east course to the sea. On meeting the bank of sand and shingle thrown up by the tide along the coast, its course is deflected, and a lagoon parallel to the shore is formed, the stream forcing its way through the barrier only when reinforced by rain and aided by a favourable wind. On a still day in December, 1883, it had cut itself a channel through the bank, and at the line of meeting of the fresh water with the current of the Mediterranean a sort of breakwater was formed of small pebbles piled one above another, behind which the stream gently mingled with the sea. A storm of wind and rain, however, soon restored the normal conditions. Similar phenomena have been noticed with regard to small streams entering the Moray Firth, east of the mouth of the Spey.

GENERAL.

The Relation of Geography to History.—Mr. F. W. Parker read a paper on this subject to the Conference of American and European Geographers in Chicago, which is now published by the National Geographic Society. He regards geography with its kindred sciences of inorganic matter as the science of the physical conditions of life, and holds that the social evolution of life can best be studied from its structural and meteorological environment. He holds that Carl Ritter's general principle that every characteristic area of the Earth's surface has had a determining influence on the special evolution of mankind, requires several modifications: 1. The same surface structure may influence man very differently in each stage of development. What would prove an obstruction to growth in one phase of evolution will be in another phase of the greatest assistance. Thus the aborigines of India deteriorated in a land which presented great advantages to the Aryans. 2. The racial life of peoples has a tendency to overcome or control the influence of structure. The Aryan race in the tropics or in Norway retained the same general tendencies and habits. 3. The human spirit in all ages, lands, and stages of growth has had the same general tendencies. This is evident in the universality of like myths among peoples who have never been in contact, and live as far apart as Eskimo and South Sea Islander. With these provisos a knowledge of geography is indispensable to the study of history. In teaching, a beginning may be made by showing the common relations of similar forms of structure. Mountains, swamps, etc., are important as places of refuge for tribes who have passed the lower phases of their development in the plains. The steppe or prairie

was best adapted to nomad life; and when tribes learned to lead a settled existence on one particular spot, they moved forward in civilization. The tribes who had reached a certain stage of civilization fled, for sake of peace or security, from the open fertile lands to the great structural fortresses of mountain and desert. Each natural fortress by its structure had a special influence; Egypt, with its valley unity, led to monarchy and monotheism; Greece, with its numerous mountain-walled valleys, fostering independent communities, favoured polytheism. Wood and timber were a means of progress, both demanding and supplying tools. An isolated position which is at one stage necessary to progress becomes later a barrier. The plateau continent of Africa has been isolated from the world by the cataracts on her great rivers blocking the natural lines of movement. River valleys often mark the lines of migration—notably so in the case of the Danube; and now the same river cuttings have become the track of our railway lines. In the highest stages of life the great plains again become the resort of men from all surrounding races, where they can be fused into one nation. History and geography are thus to be studied together, the practical observations of each throwing light on the theory of the other.

University Recognition of Geography.—In the report of the Commissioners appointed to consider the draft charter for the proposed Gresham University in London, recently issued by the Stationery Office, geography is included "among the most important subjects deserving of professorial representation in the faculty of Arts" in the department of philosophy. The report further states: "The subject of geography has recently attained academic recognition in English universities, and London offers unique advantages for the development of this subject upon scientific lines, and the Royal Geographical Society would cordially support a movement in this direction." The letter urging the recognition of geography sent by the Council of the Society is printed with the evidence offered to the Commission.

OBITUARY.

Verney Lovett Cameron.

By E. G. Ravenstein.

It is with deep regret we announce the death of Captain Verney Lovett Cameron, which took place on Easter Monday, the 26th of March, at Leighton Buzzard. Captain Cameron, on that day, had followed Lord Rothschild's stag-hounds. When returning home he was thrown by his horse, and died soon afterwards from the injuries received.

Cameron was the son of the Rev. J. H. L. Cameron, the late Vicar of Shoreham. He was born on July 1, 1844, at Radipole, near Weymouth, entered the Royal Navy in 1857, and saw service in the Mediterranean, the West Indies, the Red Sea, and on the east coast of Africa, where he was engaged in chasing slave-dhows.

In 1872, when the Royal Geographical Society resolved to send an expedition for the relief of Dr. Livingstone, who had not been heard from for a considerable time, Captain (then Lieut.) Cameron volunteered his services. The Committee, however, declined his offer, and entrusted the command to Lieut. Llewellyn Dawson. As is well known, this carefully planned expedition collapsed, for when about to start for the interior, Mr. H. M. Stanley unexpectedly arrived at the coast, and announced that Dr. Livingstone had been discovered by him, and needed no further assistance.*

* See *Proceedings*, R.G.S., xvi., 1872, pp. 413–442.

As there remained a balance of £2682 out of the £5857 collected for this object, the Council of the Society determined to fit out a second Livingstone expedition. Lieut. Cameron was selected to command it, and proceeded to Zanzibar in the company of Sir Bartle Frere. His instructions were to effect a junction with Dr. Livingstone, and, having done this, to assist him in every way. At the same time the desirability of making a thorough examination of Lake Tanganyika was pointed out to him. Dr. W. E. Dillon, Lieut. Murphy, and Mr. Robert Moffat,* a son of the famous missionary, were associated with him in this enterprise.

On March 28, 1873, the expedition left the neighbourhood of Bagamoyo for the interior, and arrived at Unyanyembe on August 5. Whilst delayed there, owing to the disturbed state of the country, Livingstone's servants arrived with their master's body. Lieut. Murphy and Dr. Dillon, who was seriously ill (he died on the road, November 18), resolved to accompany the party to the coast, whilst Cameron was determined to go on. He started on November 11, two days after his companions had turned their faces eastward, and, marching by circuitous roads through a region still unexplored, reached Ujiji, on Lake Tanganyika, on February 21, 1874. He was fortunate enough to recover there a box containing some of Livingstone's papers, together with one of his maps.

Between March 13 and May 9, 1874, Cameron explored the southern half of the lake. He determined its altitude more carefully than had been done before, and discovered the Lukuga, an outlet which was stated to flow to the Lualaba. That this latter was in truth the upper Congo became perfectly clear to Cameron when he reached Nyangwe in August. He very much desired to force the course of this river to the sea, but, not being able to procure boats, he reluctantly turned to the south. He left Nyangwe on August 28, in the company of Tipo Tip, arrived at Kilemba, the capital of Urua, in October, and remained there until February 25 of the following year, enjoying all the while the hospitality of Jumah Merikari, the "kindest of the many friends," whom he found among the Arab traders. During this period of enforced delay, he visited Lake Moryo, with its pile-dwellings, and Lake Kasali, a back-water, or a "broad" of the Lualaba.

The journey to the west coast was effected in the company of one Alvez, a black Portuguese. Alvez was by no means a desirable companion, and his good will had to be paid for dearly. On November 7, 1875, thirty-one months and ten days after he had left the Indian Ocean, Cameron arrived at Catumbela, near Benguela, and once more beheld the sea.

Cameron was the first European who crossed Tropical Africa from east to west, and this feat alone entitled him to a place of distinction among African explorers. But he did more than this. He determined many latitudes and a few longitudes, ascertained the height of numerous places above the sea, and furnished a fair account of the countries which he had traversed, and of their resources. The geographical societies of London and Paris, in recognition of his services, voted him gold medals, the Queen created him a C.B., the University of Oxford conferred upon him the honorary degree of D.C.L., and the Admiralty promoted him to the rank of Commander. He published a narrative of his journey under the title 'Across Africa' (1877), of which a second edition appeared in 1885.†

In 1878–9 Cameron travelled in Asiatic Turkey, and after his return published a work entitled 'Our Future Highway,' in which he advocated the construction of a railway from Tripoli to Homs, Aleppo, Baghdad, and Bushire, to be eventually extended to Karachi.

In 1882, jointly with Sir Richard Burton, he visited the "Gold Coast for Gold."

* Moffat died soon after leaving the coast.

† For preliminary accounts, see *Journal* R.G.S., 1875, pp. 184–228; the *Proceedings* for 1873–1876; 'Ocean Highways,' 1874; the *Geographical Magazine*, 1874–1876.

Gold was found, as a matter of course, but not in quantities sufficient to remunerate the companies which were formed to work the mines.

More recently Captain Cameron has been connected with several companies formed with the view of developing the resources of Central Africa, including the "African Transportation Company," the "Katanga Company," and the "Companhia do Zambezia."

CORRESPONDENCE.

Peak K_2 (Godwin-Austen).

I HAVE to call attention to a woodcut in that excellent work, 'Jummoo and Kashmir Territories,' by the late Mr. F. Drew, given on p. 370, as "K_2, 28,265 feet as seen from Turmik." This woodcut has quite recently been reproduced in the *Alpine Journal*, February, 1894, p. 38, by Mr. W. M. Conway, to support certain views regarding the form of the actual summit. Mr. Whymper also has used this woodcut to illustrate an article on ascents in the Himalayas, *Leisure Hour*, January, 1893, p. 193, and it may be made to do duty again by some other geographer writing on this part of the Himalayas. In this communication I give my reasons for believing the peak seen by Mr. Drew to be another and a very fine peak, K_1, or Masherbrum.

Peak K_2 has no saddle between two district summits; I feel sure if it had such a form the surveyors who carried out the triangulation work would have observed as usual to both points. Such a feature would be most useful to the topographer, and facilitate the identification of his plane table points, which often show for only a few minutes amidst the clouds that surround them. I should certainly have noticed such a marked outline, but I have only two sketches of K_2 to assist my memory. The best and nearest view I got of it was from a point above the Baltoro glacier, about 17 miles distant, K_2 showing just above an intervening high ridge, 11 miles across the glacier, on its northern side. A copy of this sketch was published in the *Illustrated London News*, February 27, 1892. It is a good reduced reproduction, but K_2 has been made far more pointed and needle-shaped than in the original. In neither of my sketches is there the slightest indication of two distinct summits, as in the woodcut.

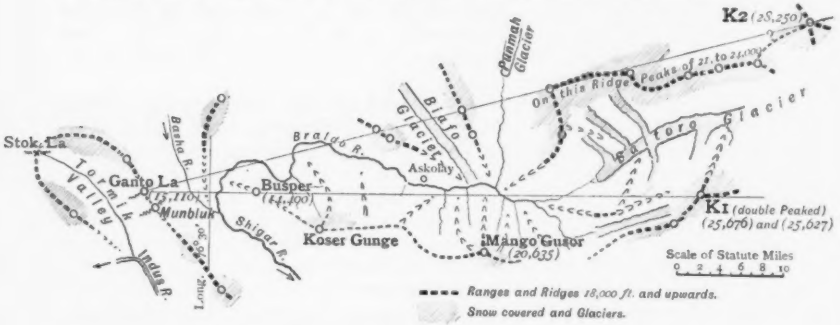
Drew writes thus: "It is not easy to get a sight of this mountain. I once saw it from a distance of nearly 70 miles, standing up in the form given in the sketch, *clear above all the great ridges.*" (The italics are mine.) He does not give its bearing from where he saw it, and he says "ridges," not "ranges." I would not recommend any one to go to the Tormik valley to get a fine view of K_2, and I am convinced that Mr. Drew was mistaken, and that he never saw that peak from the side of Tormik, *i.e.* from the westward. The peak which he did see, and which he made so good a sketch of, was K_1 (Masherbrum). From the neighbourhood of the Tormik valley K_2 is not visible unless a peak of at least 18,000 or 19,000 feet be ascended, and then if it came into view it would not show "clear above all the great ridges," but would lie beyond great ranges of 20,000 feet and upwards, and stand among a mass of snowclad peaks of great altitude. From the summit of Mashalla, 16,920 feet, a principal station of the survey further south, with a far more open ray, K_2 stands beyond and among many lofty peaks, and above heavily snowclad slopes.

The ray from the side of the Tormik valley to K_2 bears east-north-east (see sketch map); at about 25 miles distant it cuts the very high ridge, some 18,000 feet, which bounds the Biafo glacier on the south-west; following on, at about 40 miles up to 50 miles the ray lies upon the very lofty snowy mass west of the Mustagh pass, and which is considerably over 20,000 feet. K_2 is 18 miles still

further east of this, so that, if visible from the highest peak near Tormik, it could by no possibility present the appearance shown in Mr. Drew's sketch, viz. a very considerable snowy peak appearing above a flattish ridge quite bare of snow.

From Tormik, and very probably near the Ganto La, a pass Drew would cross into or out of that valley when on an official tour, he would see K_1 55 miles away, precisely as depicted by him, and bearing due west, the only intervening ridge being that of Buspur, 15,000 feet and upwards, which has no snow on it, at the northern end in the summer months. From the Ganto La the view up the Braldoh valley is a grand one; K_2 has a most striking appearance, and Mr. Drew might very easily have been misled as to his own position with respect to K_2 and its identity. In September, 1860, I ascended a peak called Munbluk, one and a half mile south of the Ganto La; and in the following year I crossed the pass. I think I should remember seeing K_2 and using it for fixing my position if it had been visible from that quarter of Baltistan.

Now as to details, K_1, or Masherbrum, has two well-defined points separated by a saddle; both were fixed by the Kashmir Triangulation, being 25,676 and



25,627 feet respectively, the lowest being to the south-west, whence the main ridge descends from it in the same direction, agreeing so well with the woodcut. The dark snowless, somewhat flat ridge rising higher to the south can be no other than the Busper; the Triangulation Station 14,490 feet is even indicated by the slight elevation on the left-hand side, the higher portion to the south being Gurindo (*vide* atlas sheet). I must here call attention to the way this woodcut has been printed in the *Alpine Journal*. It has been placed so crookedly that all the slopes are thrown out 8° or 9° from the position they are shown in Mr. Drew's work, thus bringing down the higher mass on the south (Gurindo) to the same level with the point on the north (Busper Triangulation Station). Such an error as this so materially alters the original as to render it quite misleading.* Until my attention was lately drawn to this woodcut I had never looked at it critically, or noted the position on the map from whence it is said to have been taken. I have laid off the ray on my Plane Table Survey, a photograph copy of which on the scale of the original I fortunately possess. I cannot put my finger on any point west of K_2 where Drew, at 70 miles, could have obtained such a view of it as that given in his book.

H. H. Godwin-Austen, Lieut.-Col.,
Late Deputy Superintendent Survey of India.

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* In Mr. Whymper's paper the woodcut is set up correctly.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1893–94.

Ninth Ordinary Meeting, April 9, 1894.—CLEMENTS R. MARKHAM, ESQ., C.B., F.R.S., President, in the Chair.

ELECTIONS.—*Henry E. Allhusen; Robert Hood Anderson; The Lord Cottesloe; Captain John Steven Cowans (Rifle Brigade); Sir Walter Eugène De Souza; John Eunson; Arthur Larcom; R. W. Philpott, B.A.; Captain Thomas F. B. Renny-Tailyour, R.E.; Frederick Courtney Selous.*

The Paper read was:—

"A Journey across Central Asia." By St. George R. Littledale.

The late Captain Cameron.

The PRESIDENT made the following remarks:—

Before entering upon the regular business of the evening, I feel it my duty to refer to the very sudden death of our gold medallist and very good friend, Lovett Cameron. I am almost afraid to say how long ago it was since I first made his acquaintance on the coast of the Red Sea, but he was always the same good-natured, generous, enthusiastic fellow; and he was endowed with a pertinacity which I have seldom seen equalled. He showed that quality in a high degree when he was a young lieutenant at Sheerness, full of enthusiasm for African discovery. He sought for an African appointment, and was rejected once, I think twice, but he went on pegging away until he got it, and when he had got it he started, and pertinaciously resolved to do the work before him in spite of all dangers, in spite of fevers, and I think I am bound to say regardless of expense. He was obliged to have some one to fight his battles for him in England, and it became my duty to do so; I fought them. In the mean time Cameron became the surveyor of the southern half of Tanganyika, discoverer of the Lukuga outlet, the first European who crossed Africa from east to west, and so became known to the whole civilized world. We must all admire his fine qualities, which enabled him to achieve so much, and many of us, I am sure, will regret the loss of a very good and genial friend. This afternoon the Council passed a resolution of deep regret at this sudden loss, and of sympathy for his widow and family.

The Missing Swedish Expedition.

I think I must also refer, before we pass on to the business of the evening, to those brave young Swedes who are now lost in the Arctic regions. Alfred Bjorling was a youth who had devoted himself from boyhood to discovery. When only seventeen, he was the first to ascend the highest mountain in Northern Scandinavia; when nineteen, he assisted in scientific investigations in Spitzbergen; when twenty, he was exploring the northern part of Greenland beyond the Danish settlements, and then got further than any European had ever been along the inshore of Melville Bay; and when only twenty-one he started on this adventurous expedition, with one companion, Evald Gustaf Kallstenius, a young student of natural history at Upsala. They went away in a schooner of 35 tons into Baffin's Bay, and were at last driven by the ice on to one of the Cary Islands. I have been on these islands myself, and they are dreary enough. There was found Bjorling's last record. He and his party went away in a boat to Cape Clarence, hoping to find an Eskimo settlement on the western side of Baffin's Bay. The record merely said, if any ship found it, would the captain have the kindness to call at Cape Clarence. This will be two years ago next autumn. One longs to be able to help, if it be only by a subscription, for one dreads to think of the terrible miseries they must have

gone through. To my great astonishment, I heard three days ago that the expedition which was announced as about to start from America to search for them is not going; but I hear that two, if not three, Swedish gentlemen have started in vessels to see what can be done either to succour them or to ascertain their fate. I am quite sure that, when you tell your children heroic stories for their example, you cannot find one more pathetic than that of these two youths, who certainly do great honour to their country. They are martyrs to science in the noblest sense. The least we can all do is to subscribe and assist in those searches that are being undertaken, and a subscription has been opened at the Society's rooms for the purpose of helping the Swedes in their endeavours. I really believe that it is just possible that they may still be alive. On Saturday I received by post a little white book, the narrative of four Russian sailors who lived without help or succour for six years on Spitzbergen, sent to me by Baron Nordenskjold, and I look upon it as a signal of hope. So let us hope on, and do what we can to help these gallant young fellows.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By HUGH ROBERT MILL, D.Sc., *Librarian*, R.G.S.

THE following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.	Mag. = Magazine.
Ann. = Annals, Annales, Annalen.	P. = Proceedings.
B. = Bulletin, Bollettino, Boletim.	R. = Royal.
Com. = Commerce, Commercial.	Rev. = Review, Revue, Revista.
C. R. = Comptes Rendus.	S. = Society, Société, Selskab.
Erdk. = Erdkunde.	Sitzb. = Sitzungsbericht.
G. = Geography, Geographie, Geografia.	T. = Transactions.
Ges. = Gesellschaft.	V. = Verein.
I. = Institute, Institution.	Verh. = Verhandlungen.
J. = Journal.	W. = Wissenschaft, and compounds.
M. = Mitteilungen.	Z. = Zeitschrift.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

EUROPE.

Alps. *Jahrbuch Schweizer Alpenclub* **28** (1892–93): 264–274. **Simon.**

Alpine Gipfel-Charaktere. Eine Plauderei mit Skizzen und einem Panorama. Von S. Simon.

This paper contains some excellent illustrations of mountain peaks composed of crystalline and of calcareous rocks from the author's sketches and photographs, showing the dependence of scenery on geological formation and structure.

Alps. **Coolidge.**

Die deutschredenden Gemeinden im Grauen oder Oberen Bunde (Rhätien) der Schweiz. Von Rev. W. A. B. Coolidge. Separat-Abdruck aus Nr. 376 und 377, 1893, "Oesterr. Alpen-Zeitung." Size 10½ × 7½, pp. 10. *Presented by the Author.*

Alps. *Jahrbuch Schweizer Alpenclub* **28** (1892–93): 285–298. **Forel.**

Les variations périodiques des glaciers des Alpes. Par le Prof. Dr. F.-A. Forel à Morges.

An extremely interesting report, which will be summarized in the Monthly Record. It is illustrated by an excellent series of maps showing the regions of advancing glaciers at different periods from 1875 onwards.

Alps—Dachstein Group. **Simony.**

Begleitwort zur zweiten Lieferung des Werkes das Dachsteingebiet. Ein geographisches Charakterbild aus den österreichischen Nordalpen.

Nach eigenen photographischen und freihandaufnahmen illustriert und geschildert von Dr. Friedrich Simony. Wien. Ed. Hölzel 1893. Size 14 × 11, pp. 76. *Plates. Presented by the Publishers.*

Dr. Simony's fine photographs, to which the text of this memoir is subordinate, are excellent examples of views taken from the proper standpoint, each showing some special feature of structure or scenic form, and none sacrificing character to artistic effect. They are worthy of the venerable alpinist's high reputation.

Austria—Croatia. **Mohorovici-**

Der Tornado bei Novska vorgelegt in der Sitzung der südslavischen Akademie der Wissenschaften und Künste vom 22 April 1893, von A. Mohorovicić. Agram, C. Albrecht, 1894. *Presented by the Author.*

Detailed account of the effects of a tornado which wrecked a goods-train at the station of Novska, accompanied by details of the meteorology of Croatia and a series of maps and diagrams.

Black Forest Lakes. *Globus* **65** (1894): 201–206. **Sauer.**

Zirkusseen im mittleren Schwarzwalde als Zeugen ehemaliger Vergletscherung desselben. Von Dr. A. Sauer, Heidelberg.

This paper on the glacial action indicated by the cirque-lakes of the Black Forest will be referred to in the Monthly Record.

England—Palæolithic Haunts. **Smith.**

Man the primeval Savage, his haunts and relics, from the hill-tops of Bedfordshire to Blackwall. By Worthington G. Smith. With two hundred and forty-two illustrations by the Author. London, Edward Stanford, 1894. Size 9 × 6, pp. xviii. and 350. *Price* 10*s.* 6*d. Presented by the Publisher.*

After an introduction, in which the author sketches his conception of primitive man, he treats in detail of the finds of human remains and flint implements at Caddington, near Luton, and in other parts of the south-east of England, mainly in the valleys of the Lea and the Thames. Most of the illustrations represent flint implements, but several depict imagined scenes in palæolithic life with a refinement scarcely reconcilable with the text.

France—Calais. *Archæologia* **53 (2)**: 289–388. **Dillon.**

Calais and the Pale. By the Honourable Harold Arthur Dillon, Sec. S.A. *With maps.*

This interesting research into the history of the last English possession in France contains a map, on which the boundary-lines are laid down as closely as is now possible to show the limits of the Pale in 1556.

France—Lakes. *Annales G.* **3** (1893–94): 20–41, 213–226. **Magnin.**

Contributions à la Limnologie française. Les Lacs de Jura. Par le Dr. A. Magnin.

A valuable description of the lakes of the Jura mountain system, which will be referred to elsewhere.

Germany—Lakes. *Verh. X. Deutschen G.-tages* (1893): 105–115. **Ule.**

Die Temperaturverhältnisse der Baltischen Seen. Von Dr. Willi Ule. *Profiles.*

Dr. Ule has studied the distribution of temperature in the water of a number of the small lakes on the Baltic lake-ridge.

Germany—Thuringerwald. *M.G. Ges. Jena* **12** (1893): 101–133. **Regel.**

Forstwirtschaftliches vom Thüringerwald Von Fritz Regel. *With map.*

A discussion of the extent and present condition of the Thuringian Forest.

Lake Constance. *Verh. X. Deutschen G.-tages* (1893): 79–104. **Zeppelin.**

Über die neue Bodensee-Karte und die Gestaltung (Relief) des Bodensee-Grundes. Von Eberhard Graf Zeppelin. *Map.*

The survey of the Lake of Constance has been executed with great thoroughness, and its results are here discussed briefly.

Russia—Moscow, Magnetic Conditions. **Fritsche.**

Die magnetischen Localabweichungen bei Moskau und ihre Beziehungen zur dortigen Local-Attraction. Von Dr. H. Fritsche. Extract from B.S. imp. Naturalistes de Moscow, 1893 No. 4. Size 10 × 6½, pp. 40. *Five Maps.*

Dr. Fritsche here presents a discussion of his magnetic survey of the neighbourhood of Moscow, and shows on a series of maps the anomalies of dip, declination, horizontal and total intensity for a tract of country round Moscow, about 100 miles from east to west, and 50 miles from north to south.

Scandinavia. *Z. Ges. Erdk. Berlin* **28** (1893): 1–106, 393–488. **Sieger.**

Seenschwankungen und Strandwerschiebungen in Skandinavien. Von Dr. Robert Sieger. *With Maps and numerous Tables.*

This exhaustive paper was referred to on p. 262 of vol. ii. of the *Geographical Journal*.

Switzerland. *Jahresb. G. Ges. Bern* **11** (1893): 115–131. **Graf.**

Beiträge zur Topographie und Geographie der Schweiz. Vortrag von Herrn Prof. Dr. Graf.

Historical account of Swiss cartography.

Switzerland—Bibliography. **Graf.**

Bibliographie Nationale Suisse. Fascicule IIe. Plans de Villes et de Lieux habités, reliefs et panoramas, Publié par le Bureau Topographique Fédéral. Rédigé par le Prof. Dr. J. H. Graf. Bern, K. J. Wyss, 1893. Size 9 × 6. *Presented by the Federal Topographical Bureau.*

Switzerland—Mountain names. **Wäber.**

Jahrbuch Schweizer Alpenclub **28** (1892–93): 235–263.

Die Bergnamen des Berner Oberlandes vor dem XIX. Jahrhundert. Von A. Wäber.

An interesting discussion of the early mountain names in the Bernese Oberland.

United Kingdom. *J.R. Statistical S.* **57** (1894): 104–148. **Hamilton and Rawson.**

Ocean Highways: their bearing on the Food and Wages of Great Britain. By the Right Hon. Lord George Hamilton. (With discussion.)

Ocean Highways: Approaches to the United Kingdom. By Sir Rawson W. Rawson.

These papers, while essentially economic and statistical, are so far of geographical interest in their treatment of a set of conditions which are directly due to geographical causes. Lord George Hamilton considers the population dependent on ocean-borne supplies, and shows the economic necessity of British naval supremacy, while Sir Rawson Rawson analyzes the amount of trade carried on by the principal approaches from the sea, and the origin of the trade brought through each approach. Statistics show that in 1892 London carried on 31·8 per cent., and Liverpool 29·8 per cent. of the total import and export trade of the country; the ports next in order being Hull (6·2), Glasgow (3·9), and Harwich (3·1).

United Kingdom—Geological Survey. **Geikie.**

Annual Report of the Geological Survey and Museum of Practical Geology. For the Year ending December 31, 1892. Extracted from the 40th Report of the Science and Art Department, 1893, pp. 246–275.

The Work of the Geological Survey. A paper read before the Federated Institution of Mining Engineers. By Sir Archibald Geikie, F.R.S., Director-General. Extract from the *Transactions* of the Institution. Pp. 26. *Presented by the Author.*

Sir Archibald Geikie's address gives a remarkably complete though concise account of the origin, methods, and accomplished work of the Geological Survey.

Wales—Fishguard Invasion. **Rowlands.**

The Fishguard Invasion by the French in 1797. Some passages taken from the diary of the late Reverend Daniel Rowlands, some time Vicar of Llanfiangelpenybont. London, T. Fisher Unwin, 1892. Size 7½ × 5½, pp. 234. *Illustrations.*

An account of the French invasion on the Welsh coast, near Fishguard, on the 22nd of February, 1797, and of the surrender of the troops on the 24th of February.

ASIA.

Armenia, etc. **Maclean and Browne.**

The Catholicos of the East and his People. Being the Impressions of Five Years' Work in the "Archbishop of Canterbury's Assyrian Mission." . . . By Arthur John Maclean, M.A., and William Henry Browne, LL.M.

London, Society for Promoting Christian Knowledge, 1892. Size 7½ × 5, pp. xvi. and 360. *Map and Illustrations. Price 5s. Presented by the Editorial Secretary, S.P.C.K.*

A description of the life and customs, ancient and modern, of the Eastern Syrian Christians (Nestorians) of Kurdistan and Northern Persia, with an account of their religious services, and specimens from their rituals.

Asia-Minor. **Naumann.**

Vom Goldnen Horn zu den Quellen des Euphrat. Reisebriefe, Tagebuchblätter und Studien über die Asiatische Türkei und die Anatolische Bahn, Von Dr. Edmund Naumann. Mit 140 Illustrationens. München 1893. Size 12½ × 8½, pp. xvi. and 494. *Map. Presented by the Author.*

This is a popular account of a journey through Asia-Minor undertaken in the first instance in connection with the Anatolian railway. The first part deals with the land journey from Constantinople to Angora, including a number of deviations from the direct route; the second continues the narrative from Angora to Diarbekir, and thence by Erzerum to Trebizond, and there is a third part containing scientific and technical information. The present state and future projects of the Anatolian railway system are fully discussed. The illustrations in the text are interesting on account of the successful use of several colours in printing.

Asia-Minor. *Globus* **65** (1894): 123–130, 185–191. **Prittwitz and Kannenberg.**

Ein Forschungsritt durch das Stromgebiet des unteren Kisil Irmak (Halys). I. Von G. v. Prittwitz u. Gaffron, II. Von Kannenberg.

A richly illustrated description of the journey of a party of German officers in the lower Kisil-Irmak Basin, an abstract of which appeared in the *Journal* for April, p. 327.

Central Asia. *Globus* **65** (1894): 233–238. **Immanuel.**

England, Russland und Afghanistan. Geographisch-politische Betrachtung anlässlich des englisch-afghanischen Abkommens vom November 1893. Von Fr. Immanuel. Wittenberg. *With a map in colours.*

The map accompanying this paper shows the boundaries of British, Russian, and Afghan territory on the Pamirs at different dates.

Central Asia—Irrigation. **Moser.**

L'Irrigation en Asie Centrale. Étude géographique et économique, par Henri Moser. Paris, Société d'Éditions Scientifiques, 1894. Size 9 × 5½, pp. 379. *Map. Price 6 francs. Presented by the Author.*

This book will be specially reviewed.

India. **Sleeman.**

Rambles and Recollections of an Indian Official. By Major-General Sir W. H. Sleeman, K.C.B. In two volumes. A new edition. Edited by Vincent Arthur Smith. Westminster, Archibald Constable and Co., 1893. Size 8×5, pp. (Vol. I.) xxxvi. and 448, (Vol. II.) x. and 368. *Presented by the Publishers.*

This forms No. V. of Constable's Oriental Miscellany. It contains a memoir of the author and a bibliography of his writings.

India—Madras Observations. ——

Hourly Meteorological Observations made at the Madras Observatory from January, 1856, to February, 1861. Madras, 1893. Size 12½×10, pp. vii. and 299. *Presented by the Government Astronomer, Madras.*

Indian Frontiers—Hunza and Nagyr. **Leitner.**

The Hunza and Nagyr Handbook: being an Introduction to a knowledge of the Language, Race, and Countries of Hunza, Nagyr, and a part of Yasin. By G. W. Leitner. Second Edition. Woking, Oriental University Institute, 1893. Size 15×10½, pp. xxvi. and 247. *Presented by the Author.*

Japan—Whale-Fishing. *Sitzb. preussischen A. W. Berlin* (1893): 1053–1072. **Möbius.**

Ueber den Fang und die Verwerthung der Walfische in Japan. Von K. Möbius.

Herr Möbius found an anonymous Japanese work on whale-fishing, dated 1829, in the library of the Berlin Zoological Museum, and being interested in the large number of pictures accompanying the text, he induced Professor R. Lange to translate part of the description. This is now published with reproductions of eight of the original illustrations, showing how the whale was attacked on all sides by eight-oared boats and

by strong nets and harpoons. The subsequent towing ashore, cutting-up, and boiling down are vividly portrayed, showing, by the number of men employed and the appliances used, that the manufacture of whale-oil and whale-bone was an important industry in Japan in the early part of the century.

Malay Archipelago—Engano. **Modigliani.**

L'Isola delle Donne. Viaggio ad Engano di Elio Modigliani. Illustrato da xxv. Tavole, 50 figure intercalate nel testo ed una Carta geografica Milan, Ulrico Hoepli. 1894. Size 10×7, pp xii. and 312. *Price 5 fr. Presented by the Publisher.*

This volume will be specially noticed.

Sakhalin. *Petermanns M.* **40** (1894): 49–60. **Immanuel.**

Die Insel Sachalin. Von Fr. Immanuel.

An excellent summary of the geography, economic conditions, and population of Sakhalin, from recent Russian sources, with a map of the island.

AFRICA.

Algeria. *Scottish G. Mag.* **10** (1894): 185–199. **White.**

The Situation in Algeria. By Arthur Silva White. With maps.

Mr. White formulates a series of reasons for the arrested development of Algeria, and suggests the reforms most urgently required towards remedying that condition. Six maps are given, showing (1) Surface features and vegetation, (2) Political divisions and lines of communication, (3) Orographical features, (4) Mean annual temperature, (5) Mean annual rainfall, and (6) Progress of French conquest. Each map includes Tunis as well as Algeria.

Algeria—Biskra. **Pease.**

Biskra and the Oases and Desert of the Zibans, with information for Travellers. By Alfred E Pease, F.R.G.S. London, E. Stanford, 1893. Size 7×5, pp. xvi. and 112. *Maps and Illustrations. Price 4s. 6d.*

Contains a good description of Biskra and its neighbourhood, with hints as to routes, climate, and rainfall, the people, excursions, sport, etc., derived from a six months' residence in 1892-93.

Congo State—Lukuga. *Mouvement G.* **11** (1894): 27–28. **Wauters**

L'Exploration de la Lukuga, l'émissaire du Lac Tanganika par l'expédition Delcommune. Par A. J. Wauters. *With Map.*

This note is referred to in the Monthly Record.

Congo State—Equateurville. *B.S.R. Belge G.* **18** (1894): 34–60. **Lemaire.**

Etat Independant du Congo. District de l'Equateur. Station d'Equateurville. Observations météorologiques faites du 1er Mai 1891 au 31 Decembre 1892.

The result of these observations are shown in a series of diagrams, and are discussed in a somewhat general way.

East Africa. *Abrégé B.S. Hongroise G.* **22** (1893): 53–74. **Inkey.**

Notes de voyage dans l'Afrique orientale par Ladislas Inkey.

The original paper in Hungarian occupies pp. 153 to 177 of the Bulletin. It will be referred to in the *Journal*.

Egypt. **Gayet.**

Itinéraire illustré de la Haute Égypte, les anciennes capitales des bords du Nil, avec Cartes de la Haute Égypte et de la Basse Égypte. Par Al. Gayet. Paris, Maison Quantin, *not dated.* Size 7½ × 4½, pp. 290. *Price 5s.*

This volume is mainly of archæological interest. It describes the principal places on the banks of the Nile between Cairo and the island of Philæ, including Memphis, Beni-Hassan, Tell-el-Amarna, Siut, Abydos, Denderah, Thebes, Esneh, Edfu, and Assuan.

Egypt—Irrigation. **Willcocks.**

Report on Perennial Irrigation and Flood Protection for Egypt. By W. Willcocks, M.I.C.E. With a Note by W. E. Garstin. Cairo, National Printing Office, 1894. Size 12½ × 9½. *Map and illustrations.*

This report is accompanied by thirteen appendices containing discussions on various matters connected with the Egyptian Irrigation question. Appendix III. deals

with the Nile; VII. Geology of the Nile Valley; X. the Wadi Rayan reservoir; XIII. Letter by Dr. Schweinfurth on the subject of the Salt in the Wadi Rayan. The plans, etc., illustrating the report were noticed in the *Journal* for April, p. 354.

French Sudan. **Oliver.**

The French Soudan up to date—January, 1894. Compiled. . . . By Capt. S. P. Oliver. Part II. *With Maps.* From the *Proceedings of the Royal Artillery Institute* for 1894, pp. 117–139.

German East Africa. *M. Forsch. Deutschen Schutzgebiet* **7** (1894): 43–56. **Herrmann.**

Die Wasiba und ihr Land. Von Kompagnieführer Herrmann.

German East Africa—Tabora. *Z. Ges. Erdk. Berlin* **28** (1893): 305–308. **Danckelmann.**

Die geographischen Lage von Tabora. Von Dr. von Danckelmann.

Matabililand. *J. R. Colonial I.* **25** (1894): 397–436. **Selous.**

The history of the Matabele, and the cause and effect of the Matabele War. By F. C. Selous. With discussion.

Sahara. *Z. Ges. Erdk. Berlin* **28** (1893): 296–304. **Rohlfs.**

Woher kommt das Wasser in den Oasen der Sahara? Von Gerhard Rohlfs.

Somaliland. *B.S.G. Italiana* **6** (1893): 466–500, 802–842, 961–989. **Bricchetti-Robecchi.**

La prima traversata della Penisola dei Somali. Estratto del Giornale di viaggio dell' ing. L. Bricchetti-Robecchi.

Extracts from the journal of M. Bricchetti-Robecchi on his remarkable journey across Somaliland. Illustrated by numerous diagrammatic sketches.

South-west Africa. *Petermanns M.* **40** (1894): 60–64. **Dove.**

Beiträge zur Geographie von S.W. Afrika. Von Dr. K. Dove. Der vertikale Aufbau des Landes.

This paper will be referred to in the Monthly Record.

Yoruba-Country. **Ellis.**

The Yoruba-speaking peoples of the Slave Coast of West Africa. Their Religion, Manners, Customs, Laws, Language, etc. With an appendix containing a comparison of the Tshi, Ga, Ewe, and Yoruba Languages. By A. B. Ellis. London, Chapman & Hall, 1894. Size 9½ × 6, pp. viii. and 402. *Price* 10*s.* 6*d.*

Lieutenant-Colonel Ellis of the First Battalion of the West India Regiment, whose death during the recent campaign in West Africa must be fresh in the minds of our readers, was a profound student of West African peoples and languages, as his former books of Ewe- and Tshi-speaking peoples and on the history of the Gold Coast testify. His researches in this direction are completed by the volume now before us on the Yoruba-speaking peoples, the publication of which almost coincided with his death. The Yorubas are an inland people who have only recently occupied the sea border on the Slave Coast between Badagry and the Benin river, being driven southward by the Mohammedanized tribes of the north. Colonel Ellis conveys a large amount of information regarding the people and their country with a literary skill which makes the perusal of the book a pleasure to the least ethnological reader.

NORTH AMERICA.

Alaska—Ethnology. **Murdoch.**

Ethnological Results of the Point Barrow Expedition. By John Murdoch. —Ninth Annual Report of the Bureau of Ethnology to the Secretary of the Smithsonian Institution, 1887–88. By J. W. Powell, Director. Washington, Government Printing Office, 1892. Size 11½ × 8, pp. 1–441. *Map and Illustrations.*

A fully illustrated and exhaustive account of the Eskimo of Alaska.

Bering Sea and Alaska. **Dawson.**

Notes on the Geology of Middleton Island, Alaska. By George M. Dawson. From *Bull. Geol. Soc. Am.*, vol. iv., 1892. Size 10 × 6½, pp. 427–431.

Geological Notes on some of the Coasts and Islands of Bering Sea and vicinity. By George M. Dawson. From *Bull. Geol. Soc. Am.*, vol. v., 1894. Size 10 × 6½, pp. 117–146. *Illustrations.*

Notes on the occurrence of Mammoth remains in the Yukon district of Canada and in Alaska. By George M. Dawson, LL.D. From *Quarterly Journal Geol. Soc.*, Feb., 1894. Size 9 × 5½, pp. 9.

These papers will be summarized in the Monthly Record.

Salishan Languages—Bibliography. **Pilling.**

Bibliography of the Salishan Languages. By James Constantine Pilling. (Smithsonian Institution—Bureau of Ethnology.) Washington, 1893. Size 10 × 6½, pp. 86. *Presented by the Smithsonian Institution.*

This bibliography contains 320 titles referring to the Salishan or Flathead languages of Oregon and British Columbia.

United States—Elevation. **Gannett.**

The Average Elevation of the United States. By Henry Gannett. Extract from the Thirteenth Annual Report U.S. Geological Survey, pp. 283–289. Washington, 1894. Size 12½ × 8½. *Map in Colours.*

See *Journal* for April, p. 333.

United States—New York. *National G. Mag.* **6** (1894): 23–34. **Darton**

Shawangunk Mountain. By N. H. Darton.

Shawangunk (pronounced *Shongum*) Mountain lies between the Hudson river and the southern Catskills in Ulster County, New York, and presents an interesting case of the dependence of geographical features on geological structure. More detailed reference to Mr. Darton's work appears in the Monthly Record.

CENTRAL AND SOUTH AMERICA.

Brazil. *Z. Ges. Erdk. Berlin* **28** (1893): 243–295, 309–366. **Vogel and Ammon.**

Reisen in Mato Grosso 1887/88 (Zweite Schingú-Expedition. Von Dr. P. Vogel. Mit Anhang: Devonische Versteinerungen von Lagoinha in Mato Grosso (Brasilien). Von Dr. Ludw. v. Ammon.

Description with illustrations of the physical observations of the expedition including the determination of the fossils.

Colombia. *Jahresb. G. Ges. Bern* **11** (1893): 33–72. **Röthlisberger.**

Ein Streifzug in die Llanos von San Martin. Vortrag des Herrn Prof. Ernst Röthlisberger.

The visit to the Llano of San Martin near Bogota here described took place in 1883.

Colombia—Yesal caves. *Jahresb. G. Ges. Bern.* **11** (1893): 174–176. **Tellez.**

Erforschung der Höhlen von Yesal. Brief von Hrn. Heliodoro Tellez, übersetzt und mitgeteilt von Hrn. Prof. E. Röthlisberger.

A short description of an exploration of a series of limestone caves in the department of Santandar, Colombia, which took three days to carry out.

Guiana. *Timehri* **7** (1893): 44–74. **Hartsinck.**

The Indians of Guiana. Translated from the Dutch of J. J. Hartsinck.

A curiously minute account of the native inhabitants of Guiana in 1770.

Peru—Amazon Provinces. *P. Philosophical S. Glasgow* **24** (1893): 146–169. **Ross.**

Exploration of the Amazonian Provinces of Central Peru. By Alexander Ross. *With map.*

In this paper Mr. Ross says more on the commercial aspect of his journeys in Central Peru than in his purely geographical paper published in the *Proceedings* R.G.S. for 1892.

Jamaica. **Musson and Roxburgh.**

The Handbook of Jamaica for 1894: . . . comprising Historical, Statistical, and General Information concerning the Island. Compiled . . . by S. P. Musson and T. Laurence Roxburgh. London, E. Stanford, 1894. Size 9 × 6, pp. vii. and 555. *Map. Price* 8*s. Presented by the Publisher.*

Uruguay. **Pena and Ronstan.**

The Oriental Republic of Uruguay at the World's Columbian Exhibition, Chicago, 1893. Geography, rural industries, commerce, general statistics. By Carlos Maria de Pena and Honore Ronstan. Translated into English by J. J. Rethore. Montevideo, 1893. Size 10 × 7, pp. 54.

Contains a large detailed map of the Republic of Uruguay.

NEW MAPS.

By J. Coles, *Map Curator*, R.G.S.

EUROPE.

England and Wales. **Ordnance Survey.**

Publications issued since March 8, 1894.

1-inch :—

ENGLAND AND WALES :—162, 206, hills photozincographed in brown, 1*s.* each.

6-inch—County Maps :—

ENGLAND AND WALES :—**Lancashire**, 17, 2*s.* 6*d.* **Yorkshire**, 152, 2*s.* 6*d.* ; 76 S.E., 161 S.E., 226 S.E., 240 N.E., 265 N.E., 271 N.E., 281 S.W., 286A N.E., 288 N.W., N.E., S.W., S.E., 291 S.W., 295 S.W., S.E., 250 N.E., 282 S.E., 287 N.E., 1*s.* each.

25-inch—Parish Maps :—

ENGLAND AND WALES :—**Lancashire**, LXX. 7, 4*s.* ; 8, 5*s.* ; 10, 4*s.* ; LXXV. 7, 5*s.* ; LXXVI. 3, 5*s.* ; 9, 4*s.* ; 5, 6, 5*s.* each ; 7, 12, 13, 15, 16, 4*s.* each : LXXVIII. 4, 5*s.* ; 10, 3*s.* ; LXXXIII. 16, 5*s.* ; LXXXV. 2, 3, 4, 5*s.* each ; 15, 4*s.* ; LXXXVI. 3, 3*s.* ; 6, 8*s.* ; 7, 4*s.* ; 10, 5*s.* ; 11, 15, 4*s.* each ; 16, 5*s.* ; XCIII. 4, 5*s.* ; 8, 14*s.* ; XCIV. 8, 4*s.* ; 9, 8*s.* ; 12, 5*s.* ; 15, 8*s.* ; XCVII. 4, 5*s.* ; 13, 11*s.* 6*d.* ; 14, 5*s.* ; CI. 9, 4*s.* ; 14, 5*s.* ; CV. 1, 5*s.* ; 4, 4*s.* ; 5, 5*s.* ; 9, 8*s.* ; CVIII. 5, 5*s.* ; CXI. 6, 5*s.* ; 7, 8*s.* ; CXVI. 2, 5, 4*s.* each (coloured). **Yorkshire**, XLI. 3, 7, 8, 11, 15, 16, 4*s.* each ; LVI. 4, 4*s.* ; 8, 5*s.* ; LXIII. 2, 4*s.* ; 3, 5*s.* ; 4, 6, 8, 4*s.* each ; 11, 3*s.* ; 12, 4*s.* ; LXV. 8, 5*s.* ; 12, 4*s.* ; LXXI. 1, 3, 5, 7, 8, 4*s.* each ; LXXXII. 12, 4*s.* ; XCV. 11, 3*s.* ; 16, 4*s.* ; XCVI. 9, 4*s.* ; 13, 5*s.* ; XCVII. 5, 9, 13, 4*s.* each ; CXXXI. 1, 3*s.* ; 2, 3, 4, 4*s.* each ; CLXVI. 2, 3*s.* ; 6, 13, 14, 4*s.* each ; 15, 3*s.* ; CLXVII. 1, 2, 3, 4, 5, 7, 16, 4*s.* each ; CLXXXIII. 1, 2, 3, 4*s.* each ; 4, 5*s.* ; CLXXXIV. 1, 2, 3, 4, 4*s.* each ; 5, 5*s.* ; 6, 3*s.* ; 8, 4*s.* ; 16, 3*s.* ; CCXXIX. 4, 5, 5*s.* each ; 7, 12, 15, 16, 4*s.* each ; CCXXX. 2, 5, 4*s.* each ; 6, 5*s.* ; 9, 4*s.* ; 11, 5*s.* ; CCXXXI. 15, 11*s.* 6*d.* ; CCXXXII. 4, 9, 10, 8*s.* each ; 11, 11*s.* 6*d.* ; CCXXXIII. 1, 4*s.* ; 3, 5*s.* ; 5, 4*s.* ; 7, 5*s.* ; 8, 4*s.* ; 9, 10, 11, 5*s.* each ; 13, 4*s.* ; 15, 5*s.* ; 16, 4*s.* ; CCLVIII. 12, 4*s.* ; 16, 4*s.* ; CCXCIV. 3, 4, 14*s.* each ; 7, 8, 11, 20*s.* 6*d.* each.

Town Plans—5-feet scale :—

Ashton-under-Lyne and Stalybridge (Revision), I., VIII., IX., XI., XIV., XV., XVI., with houses stippled, 2*s.* 6*d.* each. *Index is not yet published.*

Town Plans—10-feet scale :—

Plymouth and Environs (Revision), CXXIII. 7, 16, 17, 18, 22, 24, 25 ; CXXIII. 11, 4, 5 ; CXXIII. 12, 1,3,4,5, with houses stippled, 2*s.* 6*d.* each. *Index is not yet published.*

(*E. Stanford, Agent.*)

France. **Service Vicinal.**

Carte de France, dressé par le Service Vicinal par ordre du Ministre de l'Intérieur. Scale 1 : 100,000 or 1·5 statute miles to an inch. Sheets :—VIII. 35, St. Jean-de-Luz ; IX. 36, St. Jean-Pied-de-Port ; X. 37, Ste. Engrace ; XI. 37, Laruns ; XII. 37, Luz ; XII. 38, Gavarnie ; XIII. 38, Val d'Arouge ; XIV. 38, Mont Rouch ; XV. 38, Perles ; XVII. 39, Céret ; XVIII. 39, Banyuls-sur-Mer ; XXIX. 38, Calvi ; XXX. 38, Calenzana ; XXXI. 37, Luri ; XXXI. 38, Bastia. *Price* 50 *centimes each sheet.*

Germany. **Königl. Preuss. Landes-Aufnahme.**

Karte des Deutschen Reiches. Scale 1 : 100,000 or 1·5 stat. miles to an inch. Sheet 324, Kosten, Herausgegeben von der Kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme, 1893. *Price* 1.50 *mark each sheet.*

Glasgow. **McDonald.**

Road Map of the County of the City of Glasgow and the vicinity. Compiled from actual survey. Dedicated to the Hon. James Bell, Lord-Lieutenant. A. B. McDonald, M.I.C.E., C.E., City Engineer, 1894. Scale : 12 inches to a mile. *Presented by A. B. McDonald, Esq., M.I.C.E., C.E.*

This is an entirely new survey of the city of Glasgow and the vicinity, which has been carried out in a very efficient manner by Mr. A. B. McDonald, MEM. INST.C.E. ; City Engineer, at the expense of the Corporation. The scale adopted is 12 inches to

a mile, and the map includes the area of the county of the city of Glasgow, the boundary of which is shown by a chain-dotted line. The manner in which the map has been produced leaves nothing to be desired, and as a whole it may well be considered as a striking example of local enterprise.

Switzerland. **Swiss Federal Staff**

Topographischer Atlas der Schweiz im Massstab der Original-Aufnahmen, nach dem Bundesgesetze vom. 18. Dezember 1868 durch das eidg. topogr. Büreau gemäss den Direktionen von Oberst Siegfried veröffentlicht. Scale 1 : 25,000 or 2·5 inches to a stat. mile. Sheets :—248, Vorder Wäggithal; 260, Schwiz; 288, La Muratte; 290, Lignerolles; 291, Vallorbe; 378, Sarnen; 379, Stanserhorn; 433, Gimel; 435, Bussigny; 441, La Dôle; 468, Lécherette; 470, Les Ormonts. *Price* 1 *fr. per sheet. Presented by the Topographical Bureau, Swiss Federal Staff.*

AFRICA.

Algeria. **Service Géographique de l'Armee, Paris.**

Carte topographique de l'Algérie. Scale 1 : 50,000 or 1·26 inches to a stat. mile. Service Géographique de l'Armée, Paris. Sheets :—No. 25, Djeblaa : 55, Duvivier : 57, Cap Magrona; 68, Akbou; 78, Oued Mougras; 207, El Mokreum; 272, Chanzy; 299, Lalla Maghnia. *Price* 1 *fr.* 50 *c. each sheet.*

Central and South Africa. **Bartholomew.**

Central and South Africa. By J. G. Bartholomew, F.R.G.S. Scale 1 : 5,600,000 or 88·3 stat. miles to an inch. John Bartholomew & Co., Edinburgh, 1894. *Price, mounted on cloth,* 3*s. Presented by the Publishers.*

This is a new edition of a map which has been favourably noticed in the *Geographical Journal;* it has been corrected where necessary, and brought up to date. It is drawn on a sufficiently large scale to be useful for general reference.

AMERICA.

South America. **Bartholomew.**

Commercial Map of South America. By J. G. Bartholomew, F.R.G.S. Revised by John Samson, F.R.G.S., of the *South American Journal.* Scale 1 : 10,000,000 or 159·4 stat. miles to an inch. J. Bartholomew & Co., Edinburgh, 1894. *Price, mounted on cloth,* 3*s. Presented by the Publishers.*

In this map the compiler has availed himself of all the latest and most reliable material. All the lines and railways have been carefully laid down and brought up to date by Mr. John Samson, and a number affixed to each by means of which the companies to whom the lines belong can be found. All means of communication by steamer are shown, and the rivers navigable for trading-boats are distinguished from those which are not, and insets, on larger scales, of places of importance are given.

United States. **Johnston.**

General Map of the United States, constructed from the best authorities. By W. & A. K. Johnston, Edinburgh & London, 1894. Scale 1 : 3,984,000 or 62·9 stat. miles to an inch. 2 sheets. *Price* £1 1*s. Presented by the Publishers.*

This is an entirely new map of the United States, compiled from most recent surveys and brought up to date. It is printed in well-chosen colours, rivers, lakes, and seas being shown in blue. The coast-line throughout has been taken from the Admiralty Charts. Inset plans of some of the principal cities of the United States are given on an enlarged scale, and the railways are correctly laid down. It is accompanied by an index containing all the names that appear on the map. The portion of Canada north of the United States boundary has been most carefully laid down, and, taken as a whole, the manner in which the map has been produced reflects credit on all concerned in it.

United States. **Rand, McNally & Co.**

Indexed County and Township Pocket Map and Shippers' Guide of—

Kansas,	scale 1 : 1,000,000	or 15·9	stat. miles	to an inch.
Louisiana,	„ 1 : 970,000	„ 15·3	„	„
Mississippi,	„ 1 : 840,000	„ 13·2	„	„
Missouri,	„ 1 : 1,000,000	„ 15·9	„	„
Nebraska,	„ 1 : 1,120,000	„ 17·6	„	„
Tennessee,	„ 1 : 1,150,000	„ 18·1	„	„
Texas,	„ 1 : 2,150,000	„ 33·9	„	„

Rand, McNally & Co., Chicago and New York. New editions, 1894. *Price* 25 *cents each. Presented by the Publishers, through E. Stanford, Esq.*

These maps are new editions of a series in course of publication by Rand, McNally & Co., of New York and Chicago. Each map is accompanied by an index containing information that will be useful to persons visiting the United States on business or for pleasure.

GENERAL.

German Colonies. **Langhans.**

Deutscher Kolonial-Atlas. 30 Karten mit vielen Hundert Nebenkarten, entworfen, bearbeitet und herausgegeben von Paul Langhans. Erscheint in 15 Lieferungen jede mit 2 Karten. Sechste Lieferung. Gotha: Justus Perthes, 1894. *Price* 1 *mark* 60 *pf. each part.*

This part contains Map No. 5, German industries in Central Europe, and Map No. 17, which is Sheet 3 of a map of German South-West Africa, on which also several insets are given. These maps are beautiful specimens of cartography, and contain an amount of information which must have entailed infinite labour to bring together.

The World. **Vidal-Lablache.**

Atlas Vidal-Lablache, Maitre de Conférences de Géographie a l'École Normale Supérieure Histoire et Géographie. 137 Cartes, 248 Cartons. Index alphabétique de plus de 40,000 noms. (L'Atlas complet paraîtra en 24 livraisons. Livraison, 23. Paris: Armand Colin et Cie., Éditeurs. *Price* 1 *fr.* 25 *c. each part.*

This is a very interesting part of this atlas. Map No. 52 contains projections and astronomical diagrams. No. 52B and C is a map showing the transformations of the earth's surface in recent times. No. 52D contains diagrams of the relative superficial areas of continents, catchment basins, oceans, etc., and an interesting map giving lines of equal distances 400 kilometres apart from the coast-line, both inland and on the oceans. No. 108E is a general map of New Zealand. No. 108F and G show the principal routes of traffic by land and water, the magnitude and importance of the traffic being indicated by the breadth of the line, and the tint of colour employed. The navigability of the rivers is shown, as are also the English and French coaling-stations. Steamer routes on the Atlantic and Pacific are coloured red, while those which pass through the Suez Canal are coloured green. No. 108H is an orographical map of Eastern Australia.

As usual with this atlas, each map is accompanied by well-written explanatory notes, and numerous insets are given, in addition to the principal maps.

CHARTS.

Admiralty Charts. **Hydrographic Department, Admiralty.**

Charts and Plans published at the Hydrographic Department, Admiralty, January and February, 1894. *Presented by the Hydrographic Department, Admiralty.*

No.		
1905	m = 4·97	England, south coast:—Southampton Water. 2*s.* 6*d.*
1882	m = 3·0	England, east coast:—Bridlington Bay. 1*s.* 6*d.*
1915	m = 12·0 m = 3·0 m = 0·36	Anchorages in Alaska:—Mist Harbour, Sandy Cove, Albatross anchorage. 1*s.*
1868	m = 0·36	British North Borneo, north-east coast:—Taganak to Tawi Tawi. 2*s.* 6*d.*
1811	m = 0·82	China, east coast:—Kue-shan Islands to Nimrod Sound. 1*s.* 6*d.*
1592	m = 6·0 m = 2·5 m = 0·48	China, east coast:—Yung river.
1307	m = 2·0	South Pacific, New Caledonia:—Port Bonquet, Burai Bay, Kanala Bay, Banaré Bay. 2*s.* 6*d.*
1487	m = 3·64	New Hebrides:—Pekou (Segond) Channel, and Wawa (Bruat) Channel. 2*s.* 6*d.*
1117		Anchorages in Russian Tartary and Saghalin Island:—New Plan, Sedimi Bay.

J. D. Potter, agent.

Charts Cancelled.

No.	Cancelled by	No.
1592 Yung River from the mouth to Ning-po.	Yung River and approaches	1592

Charts that have received Important Corrections.

No. A to P Index Charts, sixteen sheets. 2308 Norway, west coast:—Brand fiord to Leka. 2309 Norway:—Leka to Donnæsö. 2311 Norway, west coast:—Fleina to Vest fiord, and the Lofoten Islands. 2312 Norway, west coast:—Loften Islands to Andö. 2313 Norway, north-west coast:—Andö to Helgö. 2365 Baltic Sea:—Rostock to Arkona Light, sheet 1. 2366 Baltic Sea:—Arkona to Dievenow river, sheet 2. 2806 United States:—Charleston Harbour. 827 India, west coast:—Vengurla to Cape Comorin. 2737 India, west coast:—Viziadrug to Cochin, with the Laccadive Archipelago. 270 China Sea:—Macclesfield Bank. 2432 Tartary:—Tumen Ula to Strelok Bay, including Peter the Great Bay. 1430 Tartary:—Slavianski Bay. 691 Australia:—Normanby Sound, and Prince of Wales Channel. 2354 Torres Strait:—Cape Grenville to Booby Island.
J. D. Potter, agent.

Chile. **Oficina Hidrografica, Santiago.**

Planos de la Costa de Chile (No. 43). Rade de Curanipe; Rada de Buchupurco. Oficina Hidrografica, Santiago, Chile. *Presented by the Oficina Hidrografica, Santiago.*

N. Atlantic Ocean. **U.S. Hydrographic Office.**

Pilot Chart of the North Atlantic Ocean, March, 1894. Published monthly at the Hydrographic Office, Bureau of Navigation, Navy Department, Washington, D.C. Charles D. Sigsbee, Commander U.S. Navy, Hydrographer. *Presented by the U.S. Hydrographic Office.*

PHOTOGRAPHS.

Brazil. **Stone.**

7 Photographs of the R. Amazon, Maranham, Ceara, etc., Brazil. Taken by Sir J. Benjamin Stone, Kt. *Presented by Sir J. Benjamin Stone, Kt.*

New South Wales. **Brooks.**

60 Photographs of Monaro District, Mount Kosciusko and neighbourhood of Sidney, New South Wales. Taken by Joseph Brooks, Esq., F.R.A.S., during the years 1891 to 1893. *Presented by Joseph Brooks, Esq.*

This series consists of sixty photographs taken by Mr. Brooks in the Monaro district of New South Wales and the neighbourhood of Sydney, during the past three years. They are very good specimens of photography, and have been well chosen to convey a correct idea of the characteristic scenery of the country.

Turkey in Asia. **Devey.**

60 Photographs of the neighbourhood of Van, taken by G. P. Devey, Esq. (H.M.'s Vice-Consul for Van), and Tourshian Nishan Effendi. *Presented by G. P. Devey, Esq.*

This set consists of sixty photographs of the country, people, and buildings in the neighbourhood of Van, thirty-seven of which were taken by Mr. G. P. Devey, and twenty-three by Tourshian Nishan Effendi. The subjects have been well chosen, and, taken as a whole, they are very fair specimens of photography.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

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Ying pan-shan
Kan-tang tzu
Ching-ai-tzu
Great Wall
Hsiao-zhan
Suan-tuo Pu
Ada'a Pu
Chung-chang tzu
Liu-tun-tzu
Hsiang-tang
Tahsia
(Great Ranges)
Ha-tui-tzu
Tung-Pan-cheng
Hsin-Chang
Hwang-ho
Lan-chan Fu
Shui-pei-ho
Chao-chia Pu
Hwang-ho
Sand
Brush
Sand
Brush
Sand
Brush
Sand
Great Wall
Chang-liu-shui
Shar-pai
Hwang-ho
Gold & Mines
Ulan-ul
Camp
S.Side
S.P.
Ulan-ula
Tea-shi-tso-nak
Red Sandstone
Camp
June 17, 1892
Sandstone
June 18
June 19
South Lake
Camp
S.P. (probable sources of Toktomai)
Zurken-ula
Toktomai
Buha-mangna
Koko-shil

95 106 107 108 109 110

Lang-shan 1800 1800

Low Hills

Chahan-nor

Ashan

HANGKIN

ORAT

Chang-chi-miao Lamasery

Wei-yang-chi-tien

Wu-ko-ti

Wu-ta-ku

Ditch Willow Brush Ditch

Lamasery

Wulaho

Ta-chung-tao

Brush Sand Hillocks

San-tao-ho-tzu (San Sheng-lang)

Kang-tzu-tien

Road to Hai Pao-tzu

Sand Hillocks

Shua-tzu-shan (Orondeshi)

Tang-ko

Hwan-tie

Yin-shan (Hantagar)

Ho-kow-tzu

Erh-tzu-tou

Shih-tsui

Shang-ying-tzu

Hwang-chi-chiao

Tang-ho

1300 - 1800

Pool

Yang-hu Pu

Yikang Pu

Alkaline

Ning-hsia Fu

Wang-hu Pu

Yeh-sheng Pu

Ta-pu

Kwang-wei

Sand

Wiu-to-shan

Tsao-yuan Pu

Shang-chin

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Ashan

Shelakang

Ta-pi-ko

Hamar-hosho

Wula-shan

Ta-chi

Hsiao-miao

Kiang-ling-pai

Ta-hwei-erh

Siaolitu

Hwang-ho

Obo

Brush

Tan-kai-miao

Chiang-pai

Tsung-to

Hsiao-nien

Catholic Mission Sta.

Pai-ni-ching

Chang-ko-ying-tzu

Sand Hillocks

Road to Hai Pao-tzu

Road to Ning-hsia Fu

Road to Hsi-ning

Road to Ala-shan

Road to Ning-hsia Fu

Road to Hsi-ning

Road to Ala-shan

ORDOS

TALA

108 109 110

95 96 97

Halang-ossu Menoku

S.P.

KORLUK

Emnik-ula

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TSAIDAM

Nairchi-gol

Baga Zuha-ula

Zuha-ula

Trail to Sogonong dabah

Tore-ula

Shugan-ula

Kano

Tsaidam

Camp

Bush

Tsaidam-gol

Tola

Tsahan-kol

Ike tale-namcha

Toli eken

Bo-tong

Ruin

Tongeltie

Brush

Nomoron-gol

Nomoron kutun

Shara-tolha

Shudenge

Sang Amoye

1400

Buru-sutai Pass

Barong kure

Tsagan-gol

Kwo-shili Range

Talen-tak Range

Burhan-bota Range

Road to Burhan-bota Pass

Hill Road to Dhaza

Qim

Koko-kuduk

Sarlik-ula

Shara-gol

Alang-nor

1889

Alang-gol

Tsahan-horg

Shapka Monomakh (Prjevalsky)

Kwan-shong-kutur

Umeke-ula

Shara kuiyi kutul

Serchen-tombo

Nyulchen-tombo

Amtun-ula

Dagar-bumba

Kure-bori

Tatur

Buhukai

Kokotom P.

Chibeke

Tsahan Toha

Shuga-gol

North branch Chumar

Salt lakes

Chumar dokai

Camp May 31

Salt lakes

Salt lakes

Nanchutu ulan muren

Wet flowing

Camp June 1, 1893

South branch Chumar

Etsin-nor

Olon Korgo

Camp

Kokoshili eken

Kara-daban

North branch of Nancha tola muren or ulan muren

Wang-hu Pu

Yeh-sheng Pu

Tsao-yuan Pu

Shang-chin

Kwang-wei

Sand

Ala-shan

Hwang-ho

Canal

Range

ANG

ulan-muren

105 106 107 108 109 110

Lang-shan 1600 1800

Low Hills

Chang-chi-miao Lamasery

Hills

Chahan-nor Pitch

Ashan

Shelaksang

Ta-pu-ko

Brush

Hamar-hosho

Wei-yang-chi tie

Wu-la-shan 1500 1800

Ta-ch

Wu-ta-ku

Ditch

Willow Brush

Lamasery

Wulaho

Ta-chung-tao

Sand Hillocks

San-tao-ho-tzu (San Sheng Iaung)

Hsi-lo-miao

King Ying Pu

Ta-hua-erh

Suimalu

Hwang-ho

Tan-kai-miao

Hsiao-nan-kou

Chiang pan

Ta-tsun Ju

Pai-ni-ching

Chang-ko-ying Pu

ORDOS DESERT

ALASHAN

Kang-tzu-tien

Road to Hai Pao-tzu

Shüa-tzu-shan (Orondeshi)

Ying-ko

Kwan-tie

Yin-shan (Hantagar)

Ho-kwai-tzu

Erh-tao-ho

Shih-tsui

Shang-ying-tzu

Hwang-chi-chiao

Ping-lo

Pool

Ning-hsia Pu

Likang Pu

Alkaline

Ning-hsia Fu

Hwang-ho

Canal

Wang-ku Pu

Yeh-sheng Pu

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S.P.

Halang-ossu Menoku

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KORLUK

Emnik-ula

Ta-pa

Kwang-wei

Sand

Tsao-yuan Pu

Sheng-chih

Wiu-to-shan

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TSAIDAM

Sarlik-u

Burh. Tola gol

Hunta Tola gol

Bogeta-gol

Ike-tala-nancha

Toli-eken

Bo-tong

Yamaroo gol

Nomoron-kutun

Shara-tolha

Tenaelik

Shudenge

Naichi-gol

Camp

Tola

Izahan-kol

Brush

Ruin

Sang Amye

Burh-gutai

Barong-kure

Road to Burhan-bota

High road to Tsaan

93

Baga Zuha-ula

Zuha-ula

Trail to Sharnaga daban

Kano

Talen-tak Range

Kwo-shili Range

Tore-ula

Shugan-ula

Burhan-bota Range

Shapka Monomakh (Prjevalsky)

Kwan-shong-kutur

Tatur

Bukubai

Kokotun P.

Shuga-gol

Kuye-bori

Chibeke

Izahan-Toha

Umeke-ula

Shara-kuiyi-kutai

Serchen-tombo

Nyulchen-tombo

Khamtun-ula

Dagar-bumba

North branch Chumar

Salt lakes

Chumar-dokmai

Camp Mov. 81

Salt lake

Nanchutu ulan muren

Camp June 1, 1892

South branch Chumar

Elesu-nor

Kokoshili eken

Kara-daban

North branch of Nanchu tola muren or ulan muren

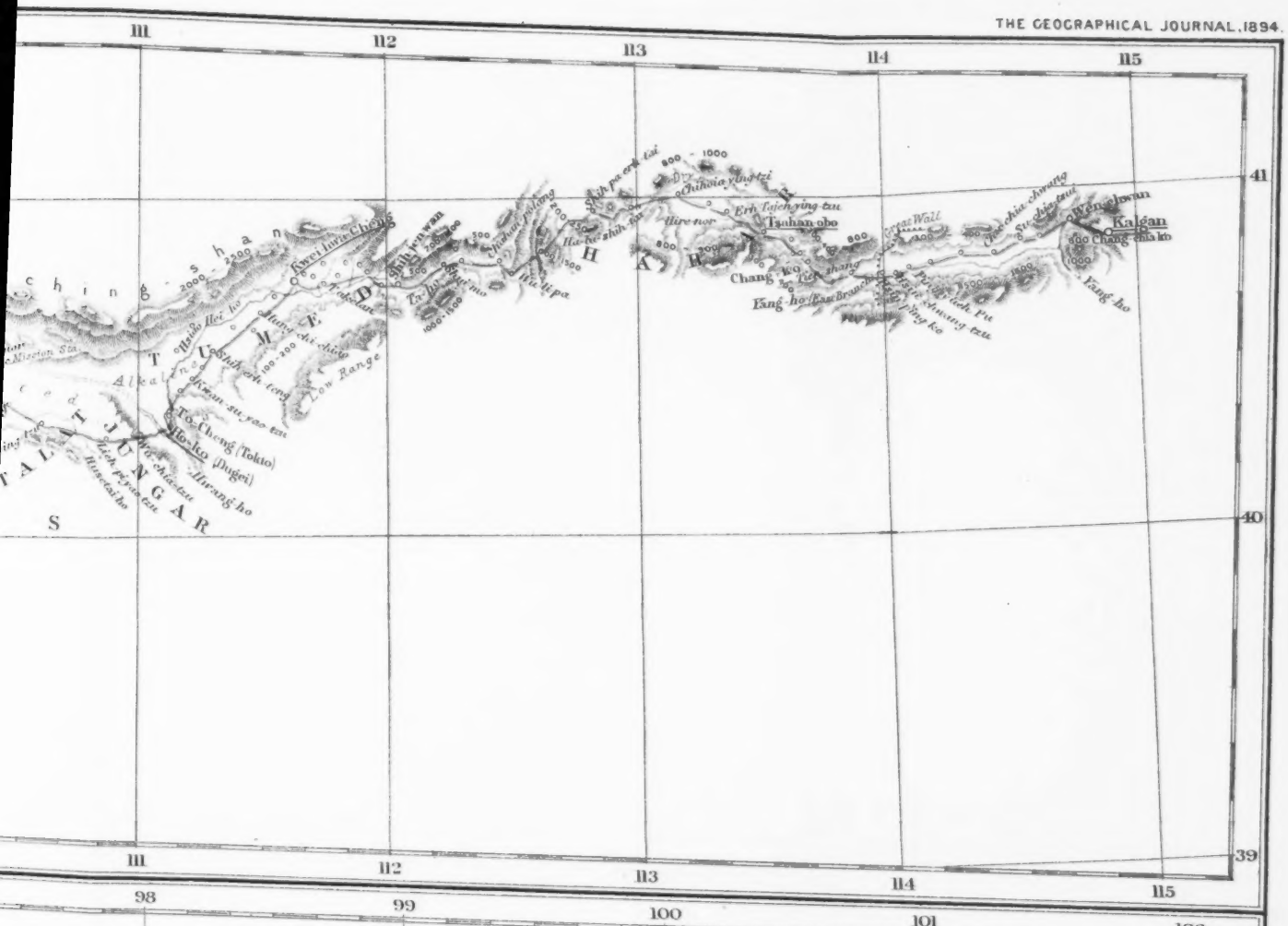
TSAIDAM

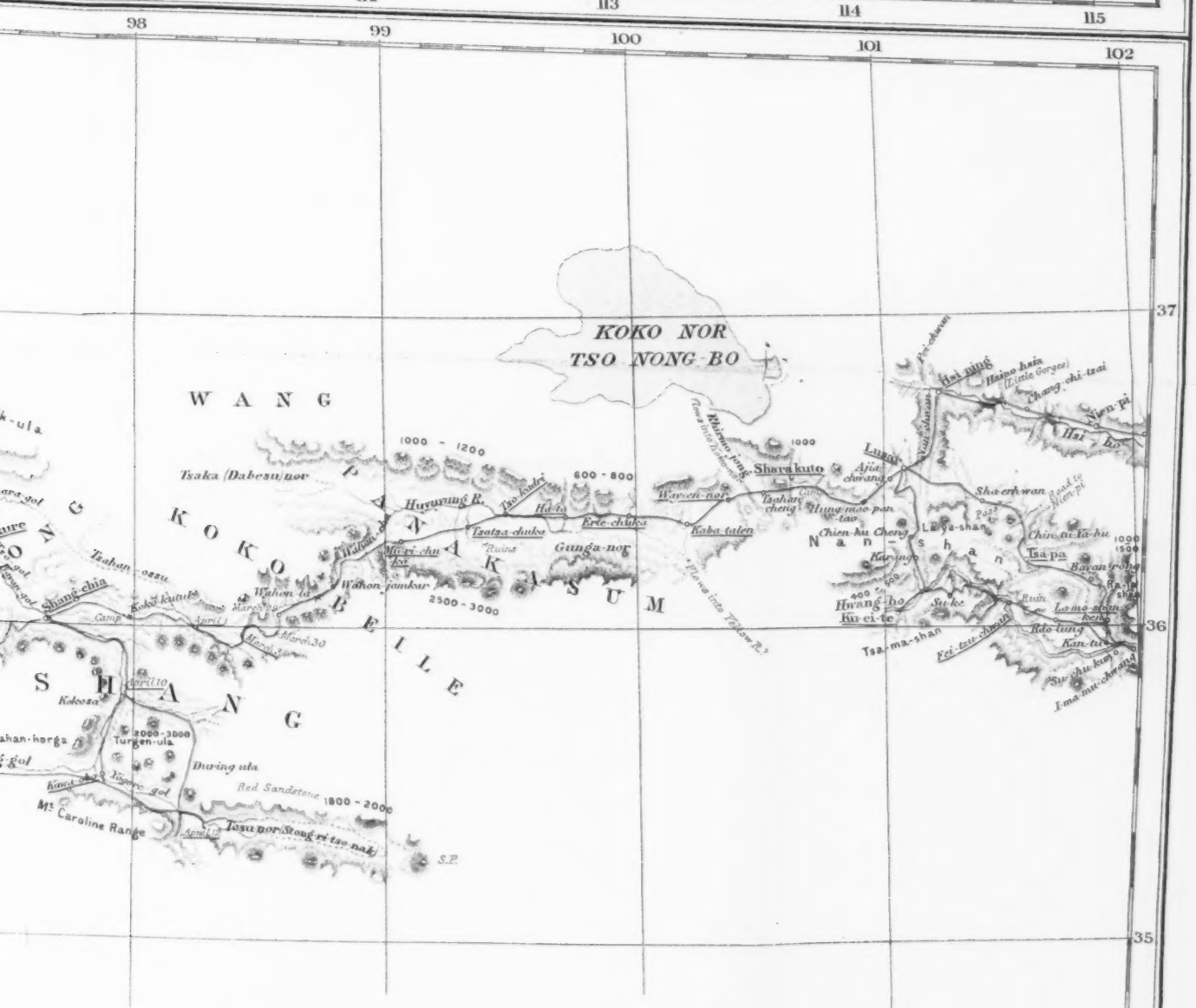
Alang-nor 1882

Alang-

Tsah

ANGHAI





ROUTE MAP
of
EXPLORATIONS IN
MONGOLIA AND TIBET
by
W. WOODVILLE ROCKHILL
in

Chung chang tzu

Liu-tun-tzu

Chao-chia Pu

Shui pei-ho

Hwang-ho

Lan-chan Fu

Tahsia (Great Gorges)

Hsiang-tang

Ho-tui-tzu

Kuo-miao tzu

Kuan-tzu

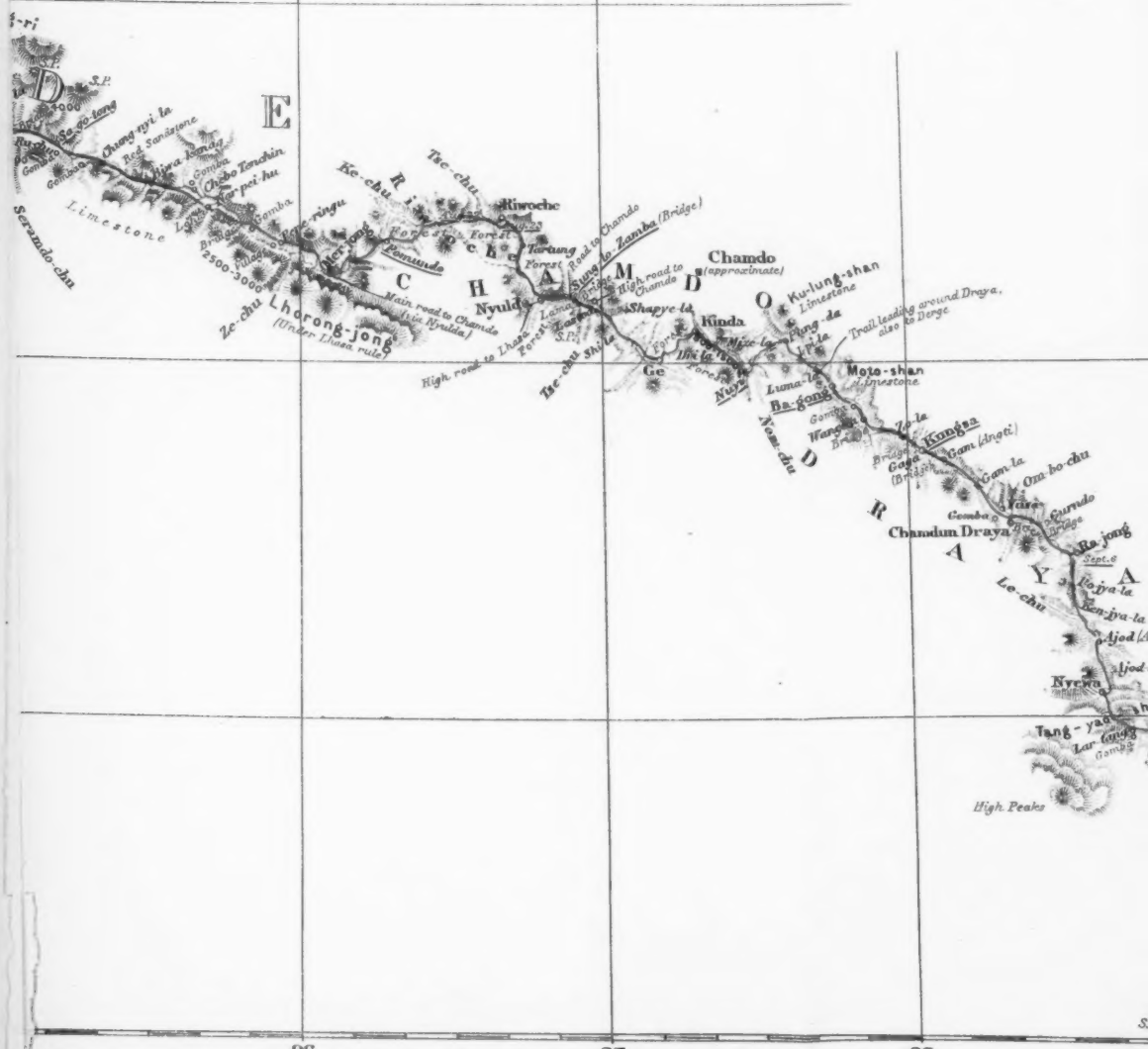
Hsin Chang

Kuan-tzu-kou

Kuan-tzu-kou

Kuan-tzu-kou

Baga Zuha-ula
Zuha-ula
Trail to Sa-mang-dabak
Kano
Tore-ula
Shugan-ula
Talen-tak Range
Kwo-shili Range
Sang Amnye
Road to Burhan-bota Pass
High road to Dutsh
Burhan-bota Range
Shapka Monomakh
(Prjevalsky)
Kwan-shong-kutur
Umeke-ula
Shara kuiyi kutul
Serchen-tombe
Nyuichen-tombe
Amtun-ula
Dagar-bumba
Tator
Buhutai
Bokotom P.
Shuga-gol
Kuyu-bori
Tsahan Tolai
Chibeke
North branch Chumar
Salt lakes
Chuma dokzai
Camp May 31
Salt lake
Alang-nor
1889
Namchutu-ulan-muren
West flowing
Camp June 1, 1889
South branch Chumar
Eleu-nor
Olon-kongai
Kokoshili-ekyn
Kara-daban
North branch of Namchu-tola-muren
or ulan muren
Range
T A N G
A
Trashiling
Chingo
July 28
July 31
Aug 2
Aug 4
Aug 5
Aug 6
Limestone Range
Pom-Arong
Pom-Arong Gen-tse
Dzuiya-lamo-la
Meia-la
Cham-chu
Lchu
Ram-nong-gang-ri
S.P.
Ram-nong Village
Su-chu
Slate, Red Sandstone, Conglomerate
2000 - 3500
Rama-chu
Batarando-chu
Po-la
Nashe-chu
Ze-go-tang
Chang-ryi-la
Red Sandstone
Limestone
Serando-chu
Ze-chu
Lhorong-jong
(Under Lhasa rule)
Main road to Chamdo via Nyuilda
Ke-chu
Tse-chu
Riwoche
Forest
Pomando
Tarung
Forest
Road to Chamdo
Zamba (Bridge)
High road to Chamdo
Nyuilda
Shapye-la
Rinda
High road to Lhasa
Tse-chu Shik
Forest
Ge
Nyila
Chan
(approx
Published by the Royal Geographical Society.
93
94
95
96
97



MONG

W

10 0 10 20

Note.

The
feet

Chu
Gol
Gomba
Ho
Koko

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ROUTE MAP
of
EXPLORATIONS IN
GOLIA AND TIBET
by
W. WOODVILLE ROCKHILL
in
1891 - 1892.

SCALE 1 : 2.027.520. 1 INCH = 32 MILES

30 40 50 100 150

Mr Rockhill's route in Red.

Note. At points along the route underlined in Black, sextant observations were taken.

The numbers (200 - 400) indicate relative altitudes in feet above the route.

S.P. — *Snowy Peaks*

Explanation of Tibetan & Mongolian words

	River	*Kutul*	*Pass*	*Shan*	*Mountains*
	Stream or River	*Kutun*	*Town*	*Shara*	*Yellow*
	Monastery	*La*	*Pass*	*Bahan*	*White*
	River	*Nor*	*Lake*	*Taidam*	*Salt Swamp*
	Blue	*Ossu*	*River*	*Tso*	*Lake*
		Ula	*Mountain Range*		

The heights above sea-level are given in an appendix to Mr Rockhill's paper.

Turner & Shaw, 43 Brewer Street, London W.